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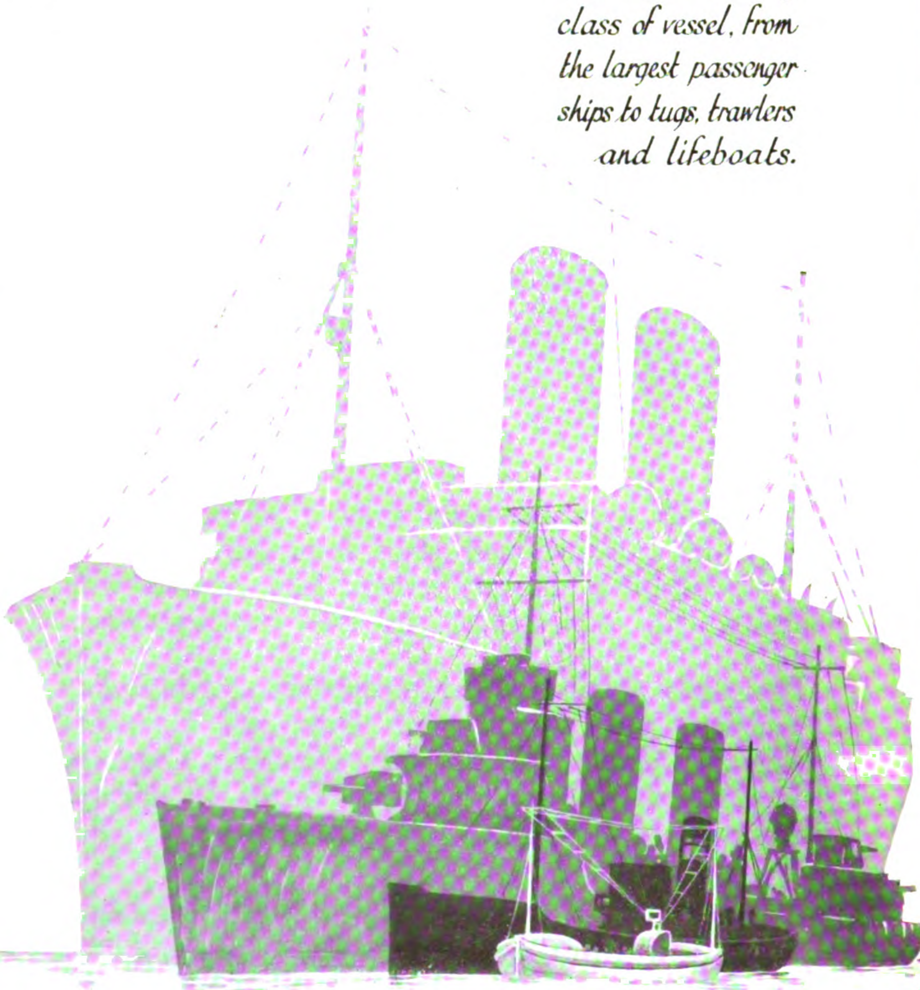

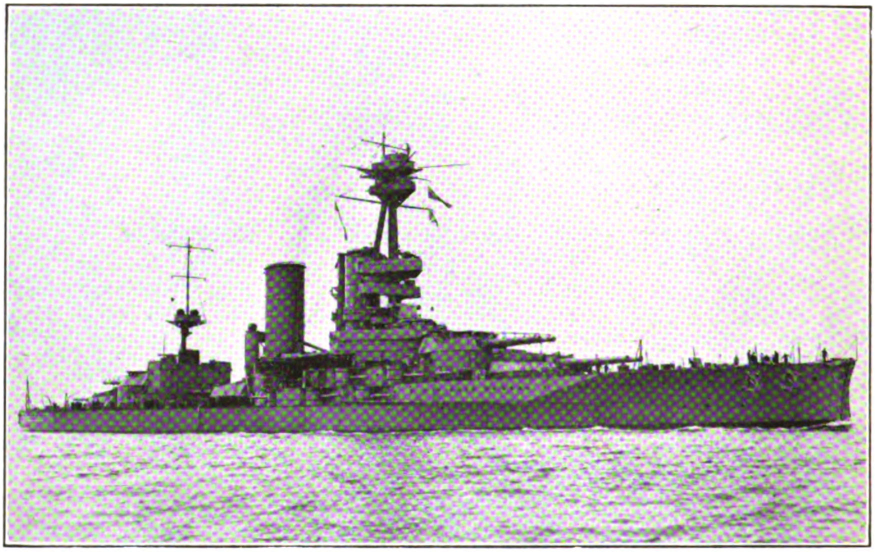

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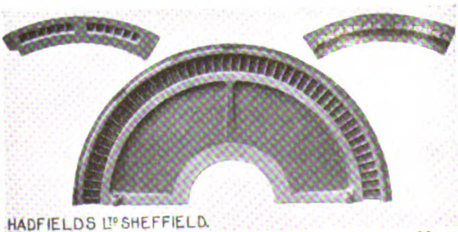

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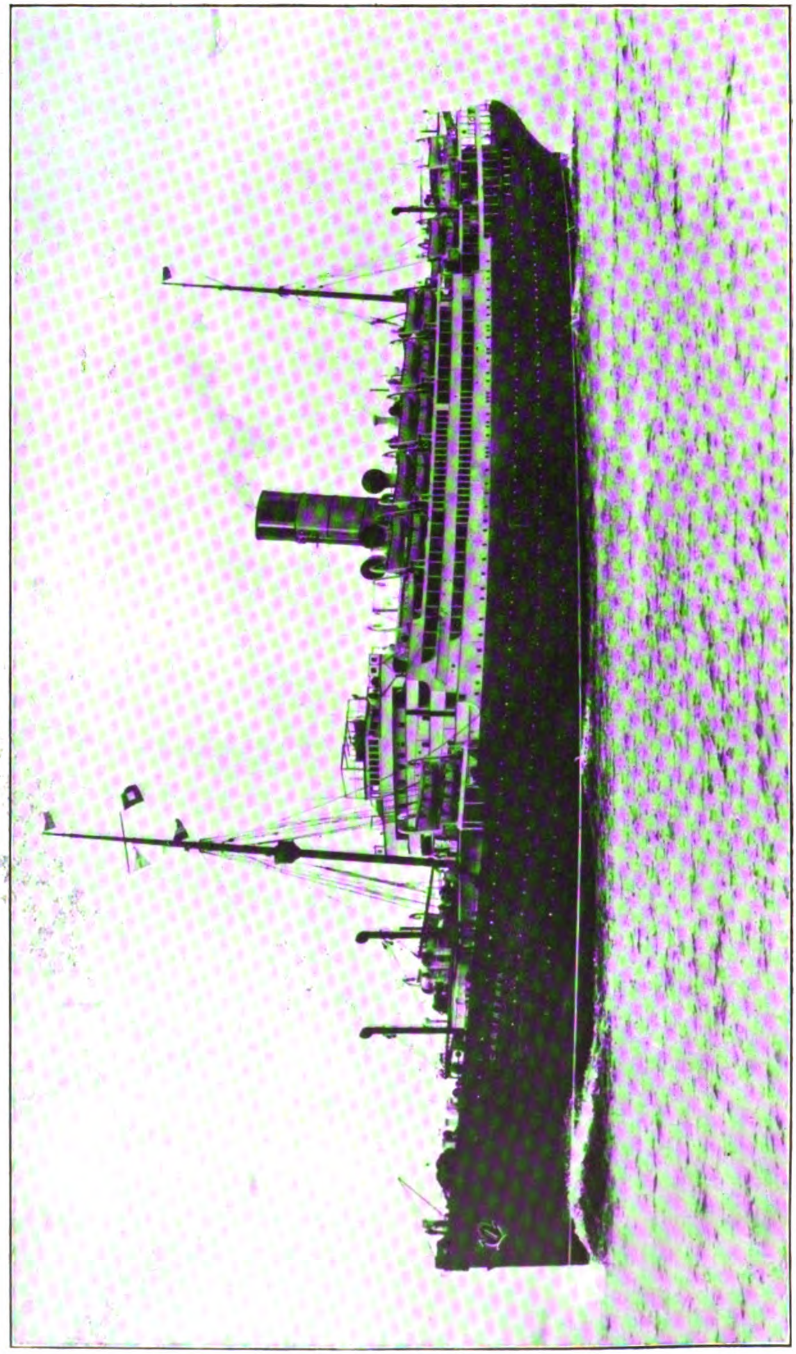

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BRASSEY'S

NAVAL AND SHIPPING ANNUAL.

1926.

EDITED BY

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PREFACE.

THOSE who are in any way interested in sea affairs, whether regarded from the political or economic point of view, are still watching with close attention the reaction of the Washington Treaty on the policies of the Naval Powers, and the effect of the rivalry between the internal-combustion engine and steam machinery on the economy of merchant shipping. A year ago it seemed as though the motor ship was destined to become the unchallenged merchant ship of the future, at any rate so far as the principal trade routes were affected. But, in the meantime, as Mr. James Richardson reveals in this volume, the question of the relative commercial efficiency of internal-combustion engines and steam engines, working under high pressure, is causing the problem of ship propulsion to be reconsidered from a new angle. In this issue, attention is specially devoted to these twin problems of sea power.

In accordance with the precedent of late years, the "Annual" is divided into two main sections, the one being concerned with the development of the navies of the world, great and small, and the other with the progress of merchant shipping. And in this connection a new departure has been made. One of the defects of the ordinary atlas, which is available to shipowners and shippers, as well as to travellers by sea, is that the size has to be so much reduced that a great deal of useful, and sometimes essential, information is omitted. With this issue of "Brassey's Naval and Shipping Annual" there is published a large scale chart of the world, which will be found in a pocket at the back of the cover. It is believed to be the most complete of its kind. It shows the principal steamship routes of the world, with the distances between the ports; the warm and cold currents are also indicated, and the time of day in different parts of the globe when it is 12 o'clock (Greenwich time) is given. Particulars are supplied of the principal submarine cables, wireless stations, and stations at which oil fuel can be obtained by shipping. It is confidently believed that this exhaustive chart will prove of interest and value to all who are concerned with sea affairs and will be framed for reference. The guide to the steamship services of the world has been revised by all the firms concerned, and will, it is believed, prove a useful complement to the chart.

Commander Charles N. Robinson, who has contributed to "Brassey's Annual" almost since its establishment, deals on this occasion not only with the evolution of British naval policy, but with the development of foreign navies, on which the late Mr. John

Leyland formerly wrote. The new arrangement by which British and foreign naval affairs are dealt with by this doyen among naval writers has its obvious advantages, since it ensures the evolution in this country and other countries being studied from a common standpoint. In the first chapter, dealing with the Naval Forces of the British Empire, Commander Robinson discusses the latest phases of policy in this country and in the Dominions, presenting a complete picture of the tendencies of naval opinion. He makes it clear that the British naval authorities are taking further drastic steps to adjust their vision to the new financial situation, while pressing upon Parliament the necessity for maintaining the British Fleet, now much reduced in size, in a state of efficiency. When he turns to a consideration of the condition of the navies of the Dominions, he lays emphasis on the progressive policy which is being adopted by Australia and New Zealand, and notes that Canada and South Africa have not yet adopted any definite plans for effective co-operation in the defence of the maritime interests of the peoples of the British Empire. Remarkable figures are quoted which show that the main burden of naval defence, whether the expenditure be considered on the basis of relative population or ocean-borne trade, still rests upon the taxpayers of the Mother Country.

In the chapter devoted to Foreign Navies, we are reminded that the Washington Treaty still casts its shadow over all the fleets of foreign Powers. In view of the discussions which are still taking place with reference to the implications flowing from the Washington agreement, the record of naval events in the United States and Japan forms an essential complement to the consideration of the naval policy of other countries. The usual tables of relative strength, embracing capital ships, light cruisers, destroyers, submarines and other auxiliaries, are published, together with profiles of the vessels as they appear on the horizon at sea, and particulars of displacement, dimensions, armament, and speed, with elevations and plans.

Admiral of the Fleet Earl Jellicoe, who has recently relinquished the appointment of Governor-General of New Zealand, contributes an important chapter on the naval policy of the Empire and the need for co-operation. It may be recalled that Lord Jellicoe, at the request of the Dominions and with the cordial concurrence of the Admiralty, made a tour of the Empire at the conclusion of the war with a view to giving advice to the several Governments as to the steps which they could most profitably take to strengthen the defence of Imperial interests by sea. In his contribution to "Brassey's Annual," Lord Jellicoe sets down, in the light of later developments, the conclusions to which he has been forced by the course of events during the past five years. He has endeavoured, as he explains, "to bring home to the people of the Empire, and more particularly to our kinsmen in the Dominions, the urgent need for co-operation in, *first*, deciding upon a naval policy, and, *secondly*, in carrying out that policy." "Is it not possible," he asks, "for all the Dominions to agree to face the situation and to come equally to the assistance of the Mother Land so that each portion of our

great Empire may bear a share of the burden proportionate to its population," Sir Alan Burgoyne's discussion of the Peace Mission of the Navy may be read with profit, both in this country and in the Dominions, in association with Lord Jellicoe's grave warning.

Sir George Thurston, who in former issues of "Brassey's Annual" has explored various aspects of the Washington Naval Treaty in its bearing upon naval design, discusses, with characteristic courage, the relative requirements of the battleship and the aircraft carrier. His contribution may be regarded as an appropriate commentary on the suspicions which have been aroused in the United States by reports which became current some months ago as to the remarkable features which were said to have been incorporated by the Admiralty in the two British battleships, Nelson and Rodney. Sir George takes a wide survey of the effect of the Treaty upon the problems of design as they affect the battleship and the aircraft carrier, and gives reasons for thinking that a very powerful combined unit can be evolved, possessing not only an effective offensive armament of serious import to any existing capital ship, but aircraft equipment of sufficient strength and purpose to compensate for the absence of aircraft carriers as separate units for fleet work.

Rear-Admiral A. P. Niblack, who wrote in the last issue of the "Brassey's Annual" on American naval policy, discusses in this volume some "by-products" of the Washington Conference. This officer of the United States Navy has enjoyed during the course of his long career exceptional opportunities of studying naval policy throughout the world. He deals on this occasion with the problems which would necessarily present themselves to a second Armament Conference. Commandante de Feo's chapter on the future of the submarine is an appropriate footnote to the considerations raised by Sir George Thurston and Admiral Niblack. This officer of the Italian Navy emphasises the possibility of realising a great development of the submarine, and suggests that the submarine merchant ship would in war time represent the best means of revictualling maritime nations and guaranteeing the safety of communications. Dr. Vaughan Cornish discusses naval geography and claims that the appearance which is presented by a map of the world or of a hemisphere, or by a globe viewed in the usual way, the North Pacific Ocean half being enclosed by an encircling coastline, is entirely misleading.

The Merchant Shipping Section opens, as in former years, with an authoritative examination by Sir Westcott Abell, Chief Ship Surveyor of Lloyd's Register of Shipping, of the present position and tendencies of the world's Mercantile Marines. He points out that, according to the latest figures, no less than 6,725,000 tons of merchant shipping is laid up in idleness, and that there is now nearly 20,000,000 tons more shipping afloat than there was at the end of 1912. His conclusions as to the future of shipbuilding are not of an encouraging character. The world's ship-producing capacity, he shows, was at least doubled as the result of the war shortage of tonnage, while the world's demand for ships is greatly reduced as compared with pre-war days. His remarks upon the future of shipbuilding

in the United Kingdom and other countries will well repay careful study. So far as the United Kingdom is concerned, an outstanding problem appears to be the loss of the pre-war wage equilibrium, with the result that dock labourers and goods porters on the railways are paid a wage 139 per cent. and 133 per cent. respectively, higher than before the war, while skilled workers in the engineering and shipbuilding trades are better off only to the extent of from 33 to 45 per cent. As a result of the great surplus of tonnage afloat and the shrinking of international trade, freights have, as Mr. R. W. Johnson points out, continued to fall. The year 1925, starting with the promise of improvement, has been a bitter disappointment to all concerned with shipping, freights reaching at length pre-war level, while working costs have remained from 85 to 90 per cent. higher than they were.

In view of the depression of shipbuilding and shipping in the United Kingdom, the discussion by the Hon. Alexander Shaw, Vice-President of the Chamber of Shipping of the United Kingdom, of the influence of high taxation on these two industries is particularly appropriate. There is a tendency in some political circles to question the deterrent effect which high taxes and high local rates have on industrial activity. Mr. Shaw deals with the problem authoritatively. He pleads for a revival of the Gladstonian tradition in public finance, and claims that to make a man work for six months or more in the year solely to provide money for Government authorities to spend is a system which has knocked out of the business life of this country the old incentive which built up its prosperity.

Sir William Noble, a former President of the Chamber of Shipping, devotes a chapter to shipping problems in relation to the Dominions. In Australia, Canada, and South Africa, in particular, attention has recently been increasingly concerned with the cost of sea transport. Sir William urges that care should be taken lest any action which may be decided upon should prove a handicap alike to producers and consumers. His arguments will repay careful consideration.

Mr. James Richardson is again responsible for the chapter dealing with developments in marine machinery, and he notes that for the first time in the history of the merchant marines the gross tonnage of motor ships building to-day definitely exceeds that of steamers actually under construction; but he adds that the percentage of motor tonnage building in this country is only 58 as compared with 130 in other countries. His consideration of the costs of operating the motor ship may be read in association with Mr. Cuthbert Maughan's more detailed contribution dealing with the balance-sheet of the motor ship. Mr. Maughan sums up the various considerations which are influencing the minds of shipowners in placing such orders for new tonnage as are essential for the maintenance of the efficiency of their fleets.

Sir Westcott Abell's examination of the position and prospects of merchant shipping adds importance to the contribution from Mr. C. E. Lloyd, M.P., President of the Iron and Steel Federation,

which is concerned with the present position of the iron and steel industries. Not only has Great Britain's capacity for production expanded, but other countries have moved in the same direction. Cut-throat competition has arisen owing to the fact that capacity for production far exceeds demand, while the constant depreciation of European currencies, the high standard of British taxation, and the increased cost of transport, have proved serious handicaps in the path of British firms engaged in the production of iron and steel.

Mr. J. R. Gordon writes with first-hand knowledge of the American shipping outlook. He traces the causes which have led to the expansion of American tonnage, examines the popular misconceptions which prevail on the other side of the Atlantic, and reminds us of " the welter of opinions and the bewildering confusion of ideas " which prevail " with their embroidery of mere catchwords devoid of real meaning or without foundation in fact." He is of opinion that the determination of the Americans, realizing the value of shipping to them, whether considered from the point of view of economics or national defence, is not to be regarded lightly, in spite of the errors of policy which have been committed under State management and the consequent heavy burden which has been cast upon the taxpayer.

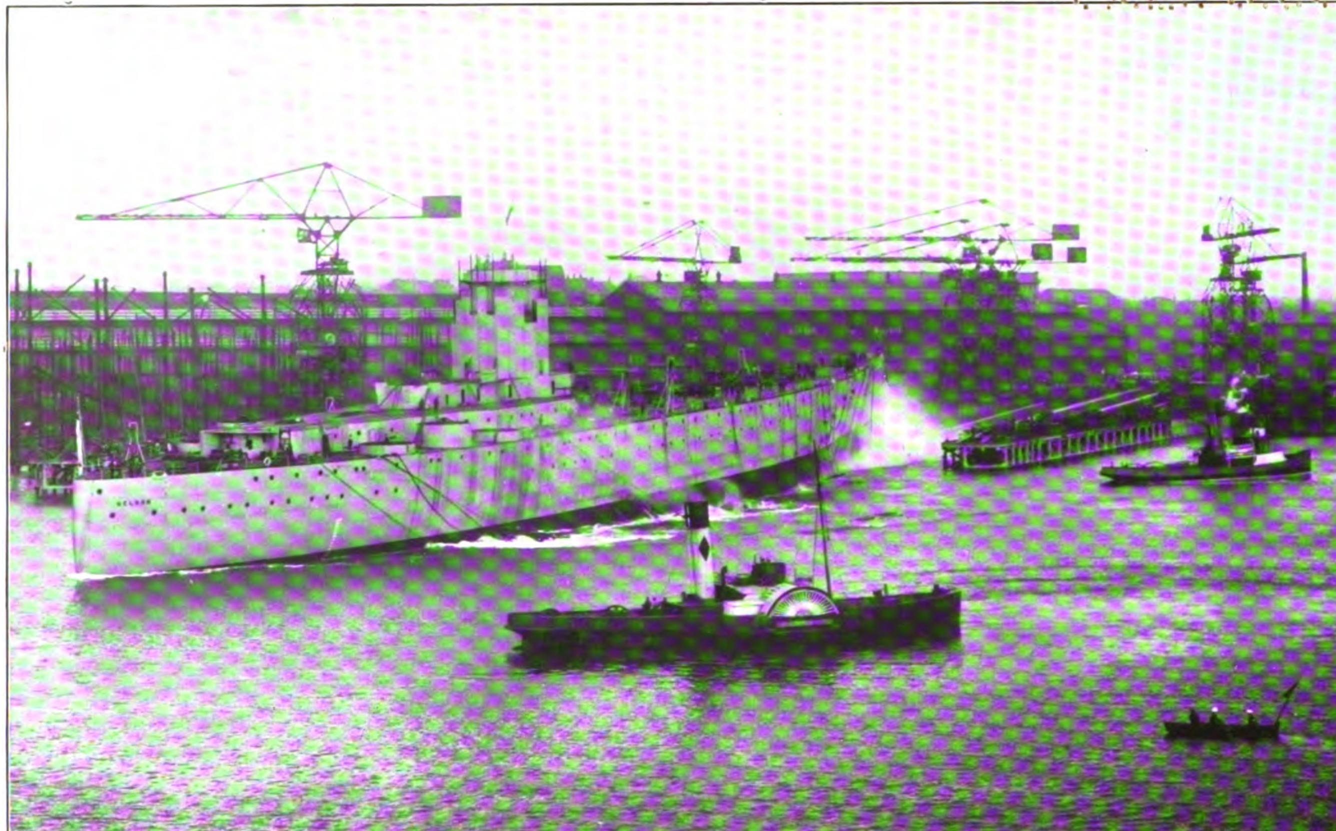
In view of the increased attention which the progress of wireless telegraphy is attracting throughout the world, Commander John A. Slee's discussion of the latest developments in the wireless apparatus of British merchant ships is a peculiarly topical contribution. Another chapter of interest to shipowners as well as shipbuilders is that of Mr. A. C. Hardy, who considers the influence of bulk cargoes on ship design.

In two important chapters the problems of the design of Cross-Channel steamers, by Mr. John Black, and the past, present, and future of the Port of Southampton are dealt with. The Hon. Everard Baring, Chairman of the Southern Railway, records with justifiable pride the progress which this port has made under the enterprising policy of this company, and gives some particulars of the schemes of dock and wharf extension which are about to be undertaken. In his opinion, great as has been the progress in the past, it will prove to be insignificant in comparison with the developments of the future.

Once more grateful acknowledgment is made of the kindness with which naval officers, shipowners, shipbuilders, and others—and in particular Lloyd's Register of Shipping, have co-operated by suggestions and valued assistance in raising " Brassey's Annual " to the high position which it now occupies as the only publication of its kind in the English-speaking world.

Alexander Richardson.
Archibald Hurd.

NAVAL SECTION.



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LAUNCH OF H.M. BATTLESHIP NELSON FROM THE HIGH WALKER SHIPYARD OF SIR W. G. ARMSTRONG, WHITWORTH & CO., LTD.; ENGINED BY THE WALLSEND SLIPWAY AND ENGINEERING CO., LTD.

CHAPTER I.

Naval Forces of the British Empire.

During 1925, the principle that the naval forces of the Empire should be at least equal to a one-Power standard generally, with a battle fleet conforming strictly to that formula, was reaffirmed by the adoption of a programme of warship construction for a term of five years. Not only the Imperial, but the Australian Government took action for the provision of new cruisers and torpedo craft. The need for replacing ships speedily becoming obsolescent could no longer be shelved, in spite of the desirability of reducing expenditure and lightening taxation, and the agreement arrived at on this matter constitutes the salient feature of the progress of naval affairs during the year under review.

But so far as other Dominions, except the Commonwealth, are concerned, no action on these lines was taken.

Judged by the value of her overseas trade, Australia makes the greatest proportionate contribution towards the cost of Imperial naval defence of any part of the Empire. This fact emerges from a statement issued by the Under-Secretary of State for the Colonies in May, 1925, in reply to a question in Parliament. Mr. Ormsby-Gore stated that the contribution of the Dominions to naval defence takes the form of maintenance of their own naval forces and establishments by the Governments of Canada, the Commonwealth of Australia, New Zealand, and the Union of South Africa. The amounts provided in the Estimates of the following parts of the Empire for the year 1924–25 are :—

United Kingdom.—£55,800,000. Expenditure per head, £1 4*s.* 10*d.* Amount spent on naval defence for every £1,000 of total import and export trade, £25 3*s.* 9*d.*

Canada.—$1,400,000. Expenditure per head, $0.15. Amount spent for every $1,000 of total import and export trade, $0.74.

Commonwealth of Australia.—£2,318,164. Expenditure per head, 8*s.* Amount spent for every £1,000 of total import and export trade, £8 14*s.* There are, in addition, special appropriations of £3,000,000 for naval construction and £1,500,000 for defence purposes generally, which are proposed to be expended over a number of years.

New Zealand.—£523,079. Expenditure per head, 8*s.* Amount spent for every £1,000 of total import and export trade, £5 5*s.* 8*d.*

Union of South Africa.—£142,035. Expenditure per head, 1*s.* 9*d.* Amount spent for every £1,000 of total import and export trade, £1 0*s.* 1*d.*

I. THE BRITISH NAVY.

New Construction.

No new construction was proposed in the British Navy Estimates of 1925–26, published on March 13, 1925, because the subject was still under the consideration of a Cabinet Committee under Lord Birkenhead as Chairman. The situation then may be briefly recorded. In the autumn of 1923, the Conservative Ministry of Mr. Baldwin decided upon a programme which Mr. Amery announced in detail to the House of Commons on January 21, 1924. He set forth the reasons why about fifty-two cruisers ought to be provided within ten years, an average of five a year, and why, to prevent a serious deficiency arising in 1929, as many above that average as was reasonable should be laid down within the first three years. The Government therefore proposed to begin eight in 1924. Their special "unemployment" programme for that year included three submarines, a submarine depôt-ship, two destroyers, a destroyer depôt-ship, two gunboats, a special ship for the Persian Gulf, an aircraft-carrier, and a minelayer. The Socialist Ministry in February, 1924, reduced the cruisers to five, retained the two destroyers, and postponed the other classes, referring the whole question of Navy replacements to a committee. Little progress was made before the General Election in the following October; nor was the subject promptly taken up by the new Conservative Cabinet which came into power in the following month. In presenting the Navy Estimates in March, 1925, Mr. Bridgeman, the First Lord, pointed out that the Government was proceeding with the investigation of this question as a whole, and proposals for new shipbuilding would be laid before Parliament when the inquiry was completed.

About the end of June, 1925, it became evident that disagreement was manifesting itself within the Cabinet in regard to the resumption of warship construction. The Birkenhead Committee, appointed to investigate the Admiralty proposals, made slow progress, holding as many as twenty-five or thirty meetings, and objection was raised to the allocation of any more public funds to warship building until certain economies in expenditure had been carried out. The agitation was conducted vigorously in the Press, and by the middle of July the resignations of Mr. Bridgeman and the Sea Lords were frequently spoken of. On Thursday, July 16, the Liberal Party had the choice of the Supply Vote in the House of Commons, and asked for the Navy Estimates to be taken, when Sir John Simon moved to reduce the Admiralty Office vote by £100, to call attention to naval expenditure, actual and prospective, and to invite the Government to make a statement as to the principles upon which they considered that expenditure to be regulated. The debate served the purpose of revealing to the Government, before it came to consider finally the requirements put forward by the Admiralty and the report of the Birkenhead Committee, the considered opinions of all parties in the House of Commons.

Security or Economy.

The Liberal view enunciated by Sir John Simon was that naval armaments should be reduced to the lowest point consistent with national safety—the phrase of the Covenant of the League of Nations. He challenged the description of the proposed new cruisers as "replacements." The view of the Navy Committee of the House of Commons was stated by the late Vice-Admiral Sir A. Henniker-Hughan, the senior naval member, who said that this Committee had endeavoured to find out where they could economize in the Naval Forces, and a scheme had been evolved which had been forwarded to the higher authorities, and which provided that sufficient money should be saved for the extra expenditure required for new ships. Lieutenant-Commander Hilton Young, D.S.O., D.S.C., spoke as a Liberal who served in the Navy during the war, and declared that, if members were sincere in their advocacy of economy, they must be prepared for economy in the Estimates about which they cared most. For his part, the Navy Estimates were those he cared most about. "The future of this country, and the cause of good in all the world rested during the war upon the ships and men of the British Fleet," he declared, but the efficiency of the Fleet could best be increased by reducing expenditure, and he advocated the closing down of Chatham, Sheerness and Pembroke Dockyards. As part of the economies promised by the Admiralty as a set-off against the cost of the new programme, the Board on September 2 announced that Rosyth and Pembroke Dockyards were to be reduced to a care and maintenance basis.

The Government's Decision.

The decision of the Ministry was announced by Mr. Baldwin in the House of Commons on July 23. The Government found it possible, in view of the peaceful outlook of the world and the absence of any naval antagonism between the Great Powers, very largely to modify the proposals for new construction which were adumbrated two years earlier. They decided that the requirements of fleet replacement would be met if two cruisers were laid down in October, 1925, and two more in February, 1926, and by an annual construction thereafter of three cruisers, during the normal life of the present Parliament. Some of these ships will conform to the existing 10,000-ton type, and the remainder will be of a smaller and less expensive type, which the Admiralty have designed, of approximately 8,000 tons displacement. It was also decided that the annual construction of nine destroyers, beginning in the financial year 1927–28, and six submarines, beginning in the financial year 1926–27, will be required, with certain ancillary vessels.

A White Paper (Cd 2,476) was issued giving the following schedule, which it will be seen provides for the construction of eighty-one vessels and a floating dock up to 1930, when the situation

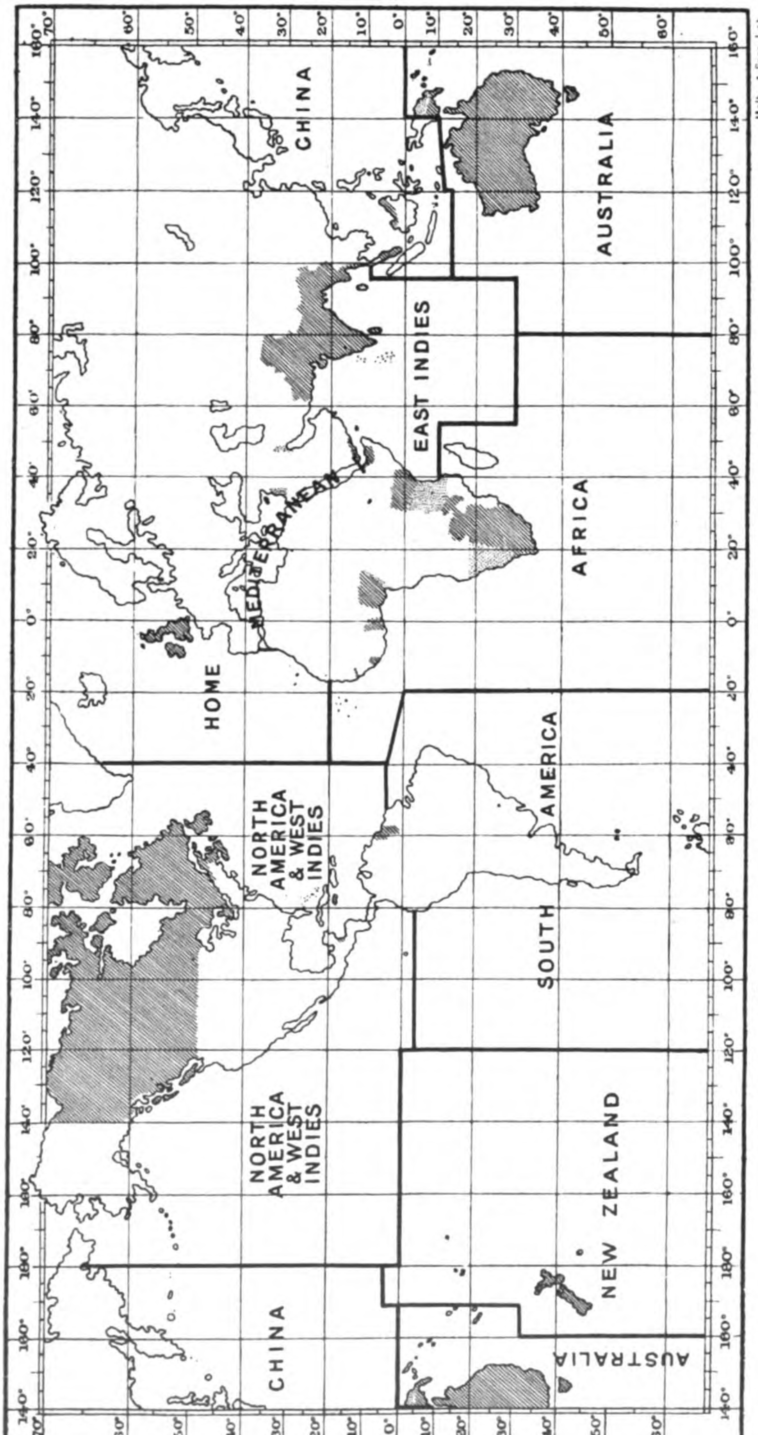


CHART SHOWING LIMITS OF BRITISH NAVAL STATIONS.

(The British Empire is shown by ruling and the Mandatory Territory of the British Empire by stippling.)

must be reviewed by the new Parliament in the light of the circumstances of that time :

	1925-26.	1926-27.	1927-28.	1928-29.	1929-30.
Cruisers—					
Class "A"	4	2	1	1	1
Class "B"	—	1	2	2	2
Aircraft-carriers	—	—	—	—	1
Destroyers	—	—	9	9	9
Submarines "O" type	—	6	6	6	5
Submarines, fleet type	—	—	—	—	1
Gunboats	4	—	—	1	—
Motor launches	—	4	—	—	—
Submarine depôt ships	—	1	—	1	—
Net layer	—	—	—	—	1
Repair ship	—	1	—	—	—
Floating dock	1	—	—	—	—

The total cost of the above programme is estimated at £58,000,000, of which £37,670,000 is expected to fall on Navy Votes from 1925–26 to 1929–30 inclusive. The cost in the first year is only £527,170, which the Admiralty have agreed to find by savings elsewhere, this being a part of the compromise effected when the programme was agreed to. As Mr. Churchill told the House of Commons, from the standpoint of finance he had supported this programme, but he asked that it should be begun next year (1926–27) instead of this year, so as to be an easement to the finance of the country. On behalf of the Treasury, he proposed that the programme should be delayed for one year, but that if the Admiralty could economize in other directions they should be free to accelerate. The Cabinet decided that the programme ought not to be delayed, but begun at once, and the Admiralty should make economies which would offset the cost of the acceleration.

New Economy Committee.

For the purpose of securing every possible reduction in naval expenditure, and also throughout the Service Departments, a committee of three persons, not connected with the Government, was appointed to examine the maintenance costs and interior economy of the Navy, Army and Air Force. This committee was related to the Cabinet Committee on Economy, to which it will report, and the first subject of its investigations was Admiralty administrative expenditure. The members of the Committee, announced on August 7, 1925, were: Lord Colwyn (Chairman), Lord Bradbury, and Lord Chalmers.

A Supplementary Estimate for the Navy of £100 was presented on July 27, 1925, the details of which showed where the Admiralty were economizing to meet the first year's cost of the new programme, viz. £527,170. The savings totalled £447,070, made up of £150,000 on wages, £120,000 on messing allowances, etc., £57,070 on clothing, soap, tobacco, etc., and allowances in lieu, and £120,000 on fuel and lubricating oils. A sum of £80,000 from anticipated surpluses of appropriations-in-aid reduced the net deficiency to £100.

This solution of the important question of naval replacements

was generally approved, provided that there should be no unnecessary delay in beginning the ships and in completing them. From the standpoint of the fleets at sea, a programme is only so much paper until the first vessels are ready for service. Meagre annual appropriations since the war have considerably lengthened the period of building, adding thereby to the total cost of the ships, cumbering dockyards and bases with them for longer than need be, depriving the officers and men of the Navy of experience with up-to-date vessels, and rendering the vessels themselves semi-obsolete before their completion. Now that the amount of work to be done in the shipyards during the next five years has been so considerably lightened in comparison with that outlined two years ago—ten cruisers having been abandoned, in addition to smaller craft—the aim should be to quicken the rate of output. It is better to have fewer ships actually ready, or well advanced, than a large number retarded in construction.

Admiralty Changes.

Once again this review of naval progress has to record a change in the official control of the Navy owing to the political situation, but it may now be hoped that with the presence in office of a Unionist Government, with an adequate majority, the numerous changes of First Lords are at an end for the time being. The Right Hon. W. C. Bridgeman, who took charge of the Admiralty when Mr. Baldwin returned to power on November 4, 1924, was the sixth First Lord to hold office since the armistice, an average of one each year, the others being Lord Chelmsford, Mr. Amery, Lord Lee, Mr. Walter (afterwards Lord) Long, and Sir Eric Geddes. Mr. J. C. C. Davidson, formerly Private Secretary to Mr. Bonar Law, became Parliamentary and Financial Secretary, in the place of Mr. C. G. Ammon; and the Earl Stanhope, Civil Lord, in the place of Mr. Frank Hodges. Lord Chelmsford, in conveying to all ranks and ratings, on leaving office, his admiration of their keenness, discipline, and efficiency, said that his short tenure had prevented him from seeing as much of the practical work of the fleet as he should have wished, " but what I have been privileged to see makes me fully confident in the future of the great Service with which I am proud to have been associated."

Though Admiral of the Fleet Lord Beatty remains First Sea Lord, having taken office on November 1, 1919, for the second year in succession there was a change in the post of Second Sea Lord, owing to the death, on April 2, 1925, of Vice-Admiral Sir Michael Culme-Seymour, Bt., who had succeeded Admiral Sir Henry Oliver in the previous August. Sir Michael was the first naval member of the Board of Admiralty to die in office since Vice-Admiral the Hon. Sir Richard S. Dundas, First Sea Lord in the administration of the Duke of Somerset, died on June 3, 1861, or a period of nearly sixty-four years. Vice-Admiral the Hon. Sir Hubert Brand, Naval Secretary to the First Lord, was appointed to fill the vacancy. Vice-Admiral Sir Frederick Field, after commanding the Special

Service Squadron during its world cruise, became Deputy Chief of the Naval Staff on May 15, 1925, in place of Vice-Admiral Sir Roger Keyes, who was nominated to the Mediterranean Command; Rear-Admiral F. C. Dreyer became Assistant Chief of the Staff on October 9, 1924, in succession to Rear-Admiral A. K. Waistell; and Rear-Admiral Sir Alfred Chatfield was made Third Sea Lord and Controller from April 30, 1925, in succession to Rear-Admiral Cyril Fuller, on the last-named taking over the command of the Battle Cruiser Squadron.

New Personnel Committees.

In January, 1925, it was announced that a committee had been appointed, under the chairmanship of Rear-Admiral D. T. Norris, C.B., C.M.G., to consider and report upon certain questions affecting the functions of the directing staff of the Armament Supply Department, and the division between these functions and those of the Chief Inspector of Naval Ordnance's Department. Among the terms of reference were to ascertain whether sea experience is necessary or advisable, and what standards of educational and technical knowledge and training are required to fulfil these functions efficiently.

An Advisory Committee on Naval Chaplaincy Services was set up early in the year affecting the following religious denominations and with the members named: The Very Rev. J. A. M'Clymont, C.B.E., D.D., V.D., Church of Scotland; the Rev. D. Maclean, D.D., Free Church of Scotland, United Free Church of Scotland, Presbyterian Church of England, and Presbyterian Church in Ireland; the Rev. S. M. Berry, M.A., Baptist, Congregational, Primitive and United Methodist Churches (United Navy, Army, and Air Force Board); and the Rev. J. H. Bateson, C.B.E., Wesleyan Church. The Committee is presided over by the Secretary of the Admiralty. The Chaplains' Branch has undergone development, in common with most others in the Navy, during the past twelve years. When the war began, apart from some 125 Church of England Chaplains, the only other religion represented in the Navy List was the Roman Catholic, of which there was one Chaplain only, stationed at Devonport. In the summer of 1925, there were seventy-six Church of England Chaplains, and twenty of other churches, these including eleven Roman Catholic, four Wesleyan, and one each of the Free Church of Scotland, United Free Church of Scotland, Church of Scotland, United Board, and Congregationalist.

Royal Navy Colours.

In the realm of ceremonial, the year has been notable for the grant to the Royal Navy by the King of Colours corresponding to the King's Colour carried by the Military Forces. The new King's Colour, when carried on shore, is to be treated in the same manner as the King's Colour of a regiment, and is to receive the same marks of respect. It is never to be paraded on board ship or on foreign

territory. As the white ensign has been taken as the emblem for the King's Colour, the use of this historic flag of the Royal Navy with landing parties had to be restricted. By an order of June 12, 1925, however, its use on occasions of important ceremonial reviews, or international naval displays on shore abroad, at which the parading of the King's Colour is not authorized, is permitted at the discretion of the Commander-in-Chief or Senior Naval Officer present. The landing of the white ensign in foreign territory is to be restricted to States recognized by the British Government, and is to be limited to occasions when the head of the foreign State is present.

The list of Battle Honours to which the eight battalions of the Royal Naval Division were entitled for their services during the Great War were communicated by fleet order on February 27, 1925. The Anson Battalion were awarded the largest number—25—extending from Antwerp to Egypt and from Krithia to the pursuit to Mons. The Drake and Hood Battalions came next with 22 each, while the Hawke Battalion was awarded 21. On the anniversary of Anzac Day, April 25, 1925, the memorial fountain on the Horse Guards Parade, adjoining the south-west corner of the Admiralty, erected in memory of the 582 officers and 10,925 other ranks of the Royal Naval Division who fell in the war, was unveiled by Major-General Sir Archibald Paris. Mr. Churchill, who was First Lord when the Division was formed in September, 1914, delivered a commemorative address.

Naval Construction.

A reorganization of staff in the Naval Construction Department has been effected, the details of which were revealed in the Navy Estimates, 1925–26. The principal change was the creation of the post of Deputy Director of Naval Construction, to which Mr. C. F. Munday, formerly one of the three Assistant Directors of Naval Construction, was appointed. Mr. E. L. Attwood, C.B.E., was promoted to the vacancy for Assistant Director. The department continues under the able direction of Mr. W. J. Berry, C.B., with Mr. E. A. J. Pearce, O.B.E., as Director of Warship Production.

The battleships Nelson and Rodney, laid down in December, 1922, in accordance with the terms of the Washington Treaty, will now take four years or more from this date to complete. While the Admiralty have not yet revealed full particulars of the design of these vessels, the following statement includes information which has been published unofficially, either in England or in America. The vessels will have a displacement of 35,000 tons. The length at the waterline will be 702 feet, the extreme beam 106 feet, and the mean draught, at standard displacement, 30 feet. The Nelson class will thus be longer, broader and deeper than any previous British battleships, although this statement should be qualified by the recollection that over ten years have elapsed since the latest completed vessels of this class in the Royal Navy were laid down, and meantime much heavier and bigger battleships than the Royal Sovereign type have been constructed for the American and Japanese Navies. The

interval gave birth in the British Navy to the Hood, and as compared with that ship, the Nelson and her sister ship will be 108 feet less in length, but her beam will be 2 feet more, and draught 1½ feet more.

In some information placed before the Naval Sub-Committee of the American Congress, Captain H. H. Hough, U.S.N., Director of Naval Intelligence at Washington, was reported to have said that the Nelson class would carry nine 16-inch 50-calibre wire-wound guns, mounted in triple turrets. Captain Hough represented that all three turrets would be in the forward part of the ships, which will thus have an unusual appearance with all their big guns forward, the 6-inch battery amidships, and a single funnel and boilers right aft. The secondary battery will consist, according to Captain Hough, of either twelve or sixteen 6-inch guns, mounted in pairs in light closed turrets. There will apparently be no stern fire from the main armament. The Nelson was launched from the Armstrong yard, on September 3, 1925, by Dame Caroline Bridgeman, wife of the First Lord, and the Rodney will be launched from Messrs. Cammell Laird's by Princess Mary, Viscountess Lascelles, on December 17.

The question of how to dispose most effectively the 35,000 tons allowed by the Washington Treaty of 1922 for capital ships has undoubtedly been a very difficult problem. But there is a probability that, before many years, the situation may be eased somewhat, in fact, the designs of all types of warships may have to be reconsidered. This situation depends on the possibilities of high steam pressures for marine installations; but so convinced is Sir Charles Parsons regarding this development, that, in conjunction with William Denny and Bros., he has decided to build a vessel to be installed with steam turbines of 4,000 h.p. and having a working pressure of 500–550 lbs. per sq. in.* This pressure is double that of present marine practice, but land installations have been working successfully for some time at this pressure. The advantages of high steam pressure may be briefly stated as low fuel consumption and considerable reduction in machinery and bunker fuel weights. The venture of Sir Charles Parsons and Messrs. Denny and Bros. is sure, therefore, to be watched very closely by marine engineers throughout the world.

The Cruiser Programme.

The five cruisers of the Kent class, authorized in the Navy Estimates of 1924–25, are progressing at a fair rate of building, but are expected to occupy quite three years from the laying of their keels. These were laid down, the Berwick, at the Fairfield Company's yard, Govan, on September 15, 1924; the Suffolk, at Portsmouth Dockyard, on September 30; the Cornwall, at Devonport Dockyard, on October 9; the Cumberland, at the yard of Messrs. Vickers at Barrow, on October 18; and the Kent, at Chatham Dockyard, on November 15. The machinery contracts were allocated as set forth in the "Annual" last year.

* See *Shipbuilding and Shipping Record*, September 3, 1925.

It seems a great pity that the rate of construction should be so slow, for three years is an uneconomical term for building ships of this size. The Dreadnought battleships, of more than twice their tonnage, were constructed in about two years, and their cost per ton was low, while the Navy and the country received the benefit of the use of the ships a year earlier. Slips and plant, moreover, were set free for later vessels at an earlier date than with a three-year building period. This is an important point at the present time, when cruiser and destroyer replacements lie immediately ahead of us, and when, in the absence of any fresh international agreement, battleship construction has to be resumed in 1931.

Under the terms of the Washington Treaty, the Kent class will be restricted to 10,000 tons displacement, and their armament to 8-inch guns. No other details of their design have yet been made public, officially, but it is expected that they will have a speed of 34 knots.

New Destroyers.

To the two destroyers also provided for under the 1924–25 Estimates, the names of Amazon and Ambuscade have been given. Messrs. Thornycroft and Messrs. Yarrow, respectively, are building these vessels, the design of which may be expected, if successful, to become the standard type for the heavy destroyer replacements which become due in 1927–28 onwards. In 1917, there were 52 destroyers completed for the Royal Navy, and with an age limit of twelve years for this class, they will all be obsolete in 1929, even if no allowance is made for their abnormal wear and tear in the war. Similarly, in 1918, there were 62 destroyers completed, which will cause a tremendous gap in the flotillas in 1930, when they all become obsolete. Adding the 23 destroyers finished in 1916, and which, having had two years' war service, are already obsolete, but have not yet been replaced, there is a total deficiency of 137 vessels, out of the total strength of 189, and to replace those 137 to time, *i.e.* by 1930, we should require to lay down 135 by 1928, or within the next three years. These figures afford some idea of the need for torpedo craft of an up-to-date kind, and of how far the need is met by the Government programme referred to elsewhere.

New Minelayer's Oil Engines.

The cruiser-minelayer Adventure, laid down at Devonport in November, 1922, and launched on June 18, 1924, by Lady Chelmsford, members of the Board of Admiralty also being present during their annual inspection, will be of special interest. She is not only the first surface vessel of post-war naval programmes to be put afloat, and the only one to be classified in the new category of "cruiser-minelayers," but she is the first minelayer in the British Navy to be built specially for this duty. Although minelaying has been carried out from all sorts of craft, hitherto every minelayer has been adapted from other duties. This important work in future, however, will

demand a vessel which, with high speed, combines a certain amount of gun-power to be able to shake off an enemy cruiser or torpedo craft, and adequate capacity for the stowage of mines. The Adventure will have a displacement of over 7,000 tons, or about the size of the Emerald class, and with a length of 520 feet, she will be 58 feet broad with a mean draught of 19 feet. A novel feature of her machinery, which is being built at Devonport dockyard, will be the installation of Diesel engines for cruising purposes. The Adventure will, however, have Parsons turbines for steaming at full speed. The adoption of oil engines in a vessel of this type and size is an indication of the progressive nature of the engineering branch of the Royal Navy, for no large warship in any country has yet been fitted with internal combustion machinery.

Post-War Submarines.

Submarine "X.1," laid down at Chatham in November, 1921, and referred to in the "Annual" last year, is not yet in service, although trials have been carried out with her lasting several months. Submarine "O.1," of a smaller type, laid down at Chatham in March, 1924, is also in hand. It is regretted that, as these two submarines, and also the minelayer Adventure and aircraft-carriers Eagle and Hermes, are still regarded as confidential ships, no addition can yet be made to the published information concerning their powers.

War-Time Cruisers.

Of the three cruisers of war programmes remaining uncompleted when the last "Annual" was published, the Effingham, of the Hawkins class, was completed at Portsmouth on July 9, for service as flagship in the East Indies in place of the Chatham. She will be followed on this Station by the two vessels of the "E" type, the Emerald and Enterprise, smaller and less heavily armed but 2½ knots faster, laid down in 1918. The Emerald relieves the Colombo, and the Enterprise will replace the Cairo, about the spring of 1926. The working off of the last of these cruiser arrears from war programmes closes an unsatisfactory chapter in dockyard administration, which it may be hoped will not be repeated. From the time her keel was laid in April, 1917, until she was completed for service in July, 1925, the Effingham occupied 8¼ years in building, and the two "E" class ships were also about eight years each in hand. The parsimonious policy of not voting the necessary credits to complete these ships promptly has cost the country many thousands of pounds and the Navy much valuable experience with modern cruiser types. Even though the ships were not absolutely needed immediately after the armistice, a far-seeing policy would have completed them at once, sent them into the fleet, and paid off on to the disposal list older cruisers which had only a few more years' life in them. The Effingham in particular seems to have been the victim of unnecessary procrastination. When it was decided early in 1924 to send her to the East Indies, modifications had to be made with a

view to her service in the tropics. Amongst other items, it was considered desirable to alter the position of the galley and to add to the general ventilation. Since it must have been apparent since 1919, or before the ship was launched, that she would be wanted for service in the East, it is surprising that such alterations were not arranged for earlier.

The last submarines of war programmes in hand are L.26 and L.27, laid down in January, 1918, by Messrs. Vickers, Ltd., and transferred after the peace to Devonport and Sheerness Dockyards respectively. L.27 was due to be completed on November 30, 1925, to join the Fifth Flotilla, Portsmouth.

Aircraft-Carriers.

Although the Royal Navy has two more large cruisers converting to aircraft-carrying duties, the Courageous and Glorious, very slow progress is being made with this work, and it will be some time before it is finished. The Courageous, reconstructing at Devonport, is at present scheduled to be finished in October, 1927. No date is mentioned for the Glorious. reconstructing at Rosyth. Meantime, the Fleet Air Arm was without the services of the Furious for some years, this ship having been paid off at Devonport for alterations until commissioned on September 1 to replace the Argus. The three aircraft-carriers in regular service during 1925 were the Argus, in the Atlantic Fleet, and the Eagle and Hermes, in the Mediterranean; the last-named ship was ordered in July to the China Station.

Excluding the little seaplane carriers Pegasus and Ark Royal, now in reserve, Great Britain has six aircraft-carriers built and building, of an aggregate tonnage of 104,490. By the terms of the Washington Treaty, she is allowed 135,000 tons, and thus a margin of 30,510 tons could be made good if desired. It would, however, be impossible to make up this amount by the construction of one ship, as no aircraft-carrier exceeding 27,000 tons displacement is allowed to be built or acquired by any of the contracting Powers.

Satisfactory Trials.

Although no details of their performances were published by the Admiralty, the vessels of war programmes passed into service during late months carried out the usual full schedule of trials, except in the cases of the flotilla leaders and destroyers. For these, trials were carried out to ascertain if the machinery was satisfactory, and such speeds as were obtained showed that the vessels were repeating the results obtained previously with earlier vessels of the same classes. In all cases, the speeds at the trial displacements showed that the designed speeds as published could be obtained.

Fleet Organization.

The redistribution of the battle and cruiser squadrons which was carried out in the autumn of 1924, placed the strongest British Fleet

in the Mediterranean, a return to the disposition which existed prior to 1904, when the great movement to build up a North Sea Fleet began. In 1903, there were twelve battleships in the Mediterranean, as compared with eight in the Home Fleet, and six in the Channel Fleet, afterwards called the Atlantic Fleet. At the present time, there are eight battleships in the Mediterranean, as compared with five in the Atlantic. In 1903, moreover, there was still a battleship squadron in the Far East, composed of four ships of the Albion type. No battleships or battle-cruisers are now stationed east of Suez, but it can only be a matter of time before such vessels appear on the China Station. It is reasonable to speculate that but for the greatly increased size and cost of these ships, some would already have been sent to Singapore or to Hong Kong. In 1903, the heaviest completed battleships were of 15,000 tons, as compared with the 27,500 tons of the Queen Elizabeth ; and the total, built and building, was 65 vessels, as compared with a total of 20, built and building, in 1925, excluding four battle-cruisers.

The tendency at the present time to send the newer and better ships of the fleet eastward, in contrast to the policy which was in vogue before the war of retaining them for North Sea service, is indicated by the decision to allocate the Effingham, Emerald and Enterprise, the last three cruisers of war programmes, to the East Indies, in place of the Chatham, Cairo and Colombo. This reconstitution of the Fourth Cruiser Squadron will add 80 per cent. to its aggregate tonnage, greatly augment its gun-power, and raise its minimum full speed from 25½ to 30½ knots.

Other changes in fleet organization made or decided upon during the past year may be briefly mentioned. As from April 1, 1925, the destroyer flotillas were renumbered. The First Flotilla (Atlantic Fleet) became the Fifth Flotilla ; and the Fifth Flotilla (Mediterranean) the First Flotilla ; the Seventh Flotilla (Reserve at Port Edgar), the Ninth Flotilla ; and the Ninth Flotilla (Atlantic Fleet), the Seventh Flotilla. By these changes, the flotillas in the Mediterranean were numbered one to four, and those in the Atlantic Fleet, five to nine.

The following are the revised funnel markings of the flotillas :—

1st Flotilla, one black ; 2nd Flotilla, two black ; 3rd Flotilla, three black ; 4th Flotilla, no mark ; 5th Flotilla, one white ; 6th Flotilla, two white ; 7th Flotilla, three white ; 8th Flotilla (two-fifths' complement), one black (upper) and one white ; 9th Flotilla (Reserves), two black (upper) and one white. Markings are on the after funnel in all vessels only. In the leaders in both Mediterranean and Atlantic Fleets, the foremost funnel is marked with a 4-ft. black band round the top. Divisional commanders have a 2-ft. band, three feet from the top, on the foremost funnel, white in the Atlantic Fleet, and black in the Mediterranean.

In March, 1925, the old gunboats Dwarf and Thistle were ordered to be withdrawn from the West Coast of Africa and replaced by the war-time sloops Daffodil and Delphinium, which were fitted for hot weather service. The Dwarf and Thistle, designed in 1897 and completed in 1899, were among the oldest vessels of the Navy remaining in commission.

In the Patrol, Minesweeping and Fishery Protection Flotilla, patrol boat P.38 was renamed the Spey, and commissioned for

fishery duties in place of the trawler Exe, which was laid up at Sheerness as spare ship. Another patrol boat, P.C.73, was renamed the Dart, and commissioned to replace the trawlers Colne and Ettrick. The patrol boats in the Anti-Submarine Flotilla, Portland, have been gradually replaced by destroyers of the "R" class—the Raider, Redgauntlet, Retriever and Rocket.

The Vindictive, reconditioned as a cruiser after being employed on aircraft-carrying duties, was commissioned at Chatham on April 15, 1925, and was attached to the Second Cruiser Squadron, Atlantic Fleet, temporarily before proceeding to China to replace the Diomede, on the latter's transfer to the New Zealand service. On the Africa Station, the Dublin was replaced by her sister-ship the Lowestoft. Both events illustrate the shortage of up-to-date cruisers, for the Vindictive, which has to be refitted at some cost, made a useful aircraft-carrier by reason of her high speed; while the Lowestoft class is already over-age, and of a type which, being quite outclassed by the later oil-burning cruisers, ought now to be relegated to the reserve.

Service in Submarines.

The Admiralty decided during the past year that the development of submarines has now reached such a stage that it is no longer practicable to adhere to the system of restricting service in them to volunteers. Preference is still given, of course, to volunteers in selection, but officers are appointed and ratings drafted for service in submarines as requirements may demand. Appointments of junior officers are for three years in the first instance, after which they return either temporarily or permanently to general service. Ratings are also drafted for three years, but in the case of volunteers the period is extended to five years.

It is, indeed, remarkable that as compared with the decade before the war, when the boats were small, cramped and uncomfortable, the submarine branch to-day, with vessels which are more reliable, roomy, and seaworthy, attracts insufficient volunteers. No doubt the conduct of the Germans has left a certain stigma on the use of all under-water craft. Possibly, too, officers and men do not visualize as they did before 1914, opportunities for distinction in an impending naval war by joining the submarine branch. It used to be said that the high pay of submarine crews was the great attraction, but extra remuneration fails to afford sufficient attraction now. Submarines are the only class in which "hard-lying money" of from 1*s*. to 3*s*. a day is payable under all conditions of service, either at sea or in harbour, and without prior Admiralty sanction. Submarine allowance, too, is payable up to 6*s*. a day for officers and 3*s*. 9*d*. a day for ratings. It is probably only a matter of time before this service regains its former popularity.

Wireless and Signal Services.

Consequent on the transfer of the Coastguard to the Board of Trade, as described in the "Annual" for 1924, two new services

under the Admiralty have come into being, to work respectively the wireless stations and the signal stations of Lloyds'. The Royal Naval Shore Wireless Service is kept up to strength by the admission from time to time of volunteers from the W/T *personnel* of the fleet. The Royal Naval Shore Signal Service is similarly recruited from men of the Visual Signal Branch of the Navy in receipt of a long-service pension. The ranks are the same in both, viz. Senior Chief Officer, ranking with but after Lieutenant, R.N.; Chief Officer, of certain seniority, ranking with but after Commissioned Officer from Warrant Rank, R.N.; Chief Officer, on promotion, ranking with but after Warrant Officer, R.N.; and telegraphist or signalman, with petty officer ranks, among the ratings. The initials (S.W.S.) or (S.S.S.) after the ranks signify to which service they belong. In the Order in Council dated May 20, 1925, sanctioning the constitution of the Shore Signal Service,* it was stated to be desirable "to alter the designation of, and to specify the conditions of service of, the Force now remaining under the Admiralty for duty at Admiralty Shore Signal Stations, the officers of which will in future be officers of Your Majesty's Navy and the men of which will in future be entered in Your Majesty's Navy." The Admiralty, therefore, retain under their complete control the *personnel* needed for the few wireless and signal stations which are of naval importance. The monthly Navy List shows the number and situation of these stations.

THE FLEET AIR ARM.

The Navy Estimates of 1925–26 included for the first time charges in respect of the cost of the Fleet Air Arm. The expenditure under this head, £1,320,000, was set down as Vote 4, which vote in former years had been used for the provision for civilians employed on fleet services, now transferred to Vote 1. The expenditure takes the shape of a grant-in-aid to the Air Ministry in respect of the cost to that department of the pay, allowances and victualling of the *personnel* of the Fleet Air Arm, including the naval officers "attached" to the Air Force, and the provision of the necessary material. As the Admiralty have to formulate the requirements for the Fleet Air Arm, so they have to fight the annual battle with the Treasury, so to speak, for the money to pay for them, and later to justify this outlay before Parliament. Their responsibility is recognized by the inclusion of this vote in the Navy Estimates.

There has been no important modification of the scheme described last year for the conduct of the Fleet Air Arm. The second course for naval officers to qualify as pilots began on January 12, 1925; the third course on April 27; and the fourth on August 10. In addition, there are two qualifying courses held annually for naval observers, the first beginning at the middle of March, and the second at the beginning of October. Each course is divided into two parts, the first being taken at the Signal School and H.M.S. Excellent, and the second at the R.A.F. Base, Lee-on-Solent.

After the pilots' and observers' course, there is yet another course

* *London Gazette*, June 5, 1925.

in naval air work in progress under the new scheme. This is known as the Aviation Course, and is open to commanders, R.N., who are lent to the Royal Air Force for a short period of service with air units at home, in order to obtain practical experience of the work of the air arm in all its various aspects. The idea is to assist in permeating the higher ranks of the Navy in future with a knowledge of air matters, and in particular of the organization, training, capabilities and limitations of air units.

All this is to the good, but it is no more than is absolutely necessary, to judge by the steps which are being taken to develop naval aeronautics in other countries. Highly significant in this connection is the decision that from June 1, 1925, all midshipmen at the United States Naval Academy are to receive instruction in practical and theoretical aviation, so that on graduation they may qualify as pilots or observers, according to their physical fitness. The officers of the Royal Navy who have been appointed for air work are, for the most part, lieutenants of from one to three years' standing; although in certain cases a lieutenant-commander has been appointed. No provision is yet apparent for the instruction of cadets, midshipmen or acting sub-lieutenants in flying duties. The most which seems to have been done in this direction is to detail an aircraft-carrier for a demonstration of flying for naval cadets, such as the Argus gave in Torbay in July last.

The number of aircraft-carriers working with the fleet has remained at three during the year, the Argus in the Atlantic Fleet and the Eagle and Hermes in the Mediterranean. The small seaplane-carrier Pegasus returned from Singapore in the spring of 1925 and was reduced to reserve at Devonport, while the Ark Royal is likewise in reserve at the Nore. The Furious was undergoing alterations. It will not be until the autumn of 1927 that an addition can be made to the strength of the fleets in this respect by the completion of the conversion of the Courageous and Glorious. Only one ship, the Hermes, of 10,950 tons, was specially designed and built to carry aircraft.

Entry and Education.

The whole subject of the entry and education of officers was fully dealt with in the "Annual" last year, and no important change has since been made. The special entry of cadets continues side by side with the entries at Dartmouth, and in a speech at Shrewsbury School on June 20, 1925, the First Lord, Mr. Bridgeman, said that the former method had been a great success, and he hoped the Admiralty would get many more public school boys. It was on this occasion that the First Lord related the amusing story of the boy who went in for the examinations for Sandhurst and also for the special entry into the Navy, and who, on the same day, heard that he had been successful for both. Having been placed in a dilemma, he asked a young lady which he had better take, and without any hesitation she "plumped" for the Navy. So he joined the Navy, and when Mr. Bridgeman saw him at Malta in the spring of 1925 he was then rejoicing at the choice he had made.

A change has been made in the manner of distinguishing those officers of the Royal Navy and Royal Marines who have qualified for staff duties. In place of the initials, "W.S.," denoting officers who were qualified and eligible for a War Staff appointment, the military form of notation, "P.S.C.," has been adopted, to signify that the officer concerned has passed through the staff course at the R.N. Staff College at Greenwich. In the case of a Marine officer, the notation is "P.S.C. (n)" or "P.S.C. (m)," according to whether he has passed through the staff course at the Naval or Military Staff College respectively.

In the engineer branch, the short course which the Board decided to institute for the senior officers, to assist them in keeping their professional knowledge abreast of developments in engineering, began at the Royal Naval College, Greenwich, on April 9, 1925, when twelve officers—four engineer-captains, six engineer-commanders, and one each from the Australian and Canadian Navies—reported for study. This course, a voluntary one of about twelve weeks' duration, is to be held annually at Greenwich during the midsummer term.

Turning to the lower deck, it has to be observed that recruiting continues to be satisfactory, both as regards numbers and quality, and no difficulty appears to have been experienced in obtaining the additional fleet numbers authorized in the Estimates. The sum allocated for recruiting expenses was increased in 1925–26 from £24,000 to £29,500, and the numbers employed on recruiting from 65 to 77. A recruiting office was reopened at Canning Place, Liverpool, where Major A. K. Evans, O.B.E., M.C., R.M., was appointed in charge on April 6, 1925.

A very unusual item in the quarterly schedules of recruiting issued on July 10, 1925, was the announcement of vacancies for engine-room artificers, of which ten were to be entered at Portsmouth and eleven at Chatham in the quarter ending September 30. Direct entry to this grade had been closed for many years, the fleet training its own artificers from the boys who enter as apprentices in the Fisgard. Coupled with the offer of no less than twenty-five special entry cadetships for the engineering branch a month earlier, as compared with twenty for the executive branch, this step caused some disquiet by reason of its implied shortage of officers and petty officers for engine-room duty.

Seamen's Training.

Much more attention than formerly is now paid to the instruction of petty officers. There is a regular petty officers' course, which is compulsory for all these ratings in the seaman, signal, telegraphist, stoker and regulating branches of seniority later than December 31, 1922. All ships and establishments in home waters are required to lend such ratings for this course on requisition by the depôts, while men serving on foreign stations who have not taken the course have to do so at the earliest opportunity after their return to England. If enough confirmed petty officers of the branches mentioned are not available, classes are completed with ratings of other branches for

whom the course is considered to be most beneficial, below the age of twenty-nine.

A change was made during the year in the official text-book in Naval History for the higher educational test. The volume used for this was by a former editor of "Brassey's Annual," Mr. John Leyland, who died in January, 1924, viz. "The Royal Navy," in the Cambridge Manuals of Science and Literature. For this little volume there is now substituted the larger one by Professor G. A. R. Callender, "The Naval Side of British History," the publication of which may be said to have been the outstanding event in naval literature during 1924.

The present scarcity of young trained seamen was again illustrated by an order in May, 1925, for the acceleration of the training of ordinary seamen and boys. To facilitate drafting, and to enable accommodation to be found for the increased number of boys leaving the training establishments, it is essential, said the Board, that boys should pass both professionally and educationally for able seamen either before being rated ordinary seamen or as soon as possible afterwards. Those who pass may be rated A.B. at the Captain's discretion after not less than six months' service as ordinary seamen, excluding the time spent in training classes. This qualifying period need not, for the present, be served in a sea-going ship.

Gunnery Efficiency.

Every effort is manifestly being put forward to maintain the gunnery proficiency of the fleet. It has been decided that the regulations governing the administration of the Gunnery Proficiency Fund require amendment with a view to extending the discretion allowed to commanding officers in their assignment of awards. Payments may now be made to all ratings, including marines, who are considered to be, individually or collectively, particularly responsible for a ship's attainment of gunnery proficiency, including those most successful in competitions, drills and in the use of instructional appliances. There is no indication of any return to the pre-war practice of publishing the comparative results of gunlayers' tests and battle practices. A revised scale of prize money for pistol firing was adopted as from July 1, 1925.

Few appliances in the Navy have made such rapid progress during the last decade as the gyro compass. Since 1917, owing to the unsuitable magnetic conditions at Deptford, the whole of the work of the Compass Department has been concentrated at the new Admiralty Compass Observatory at Ditton Park, Langley, Bucks, where for some time officers have been appointed for courses in gyro work. In March, 1925, the Admiralty, having had under consideration the training of ratings for the care and maintenance of these compasses, decided that three selected chief electrical artificers or senior electrical artificers, one from each port division, were to be sent to Langley for a six months' course, on passing which they were to be detailed as instructors in the Vernon, the Defiance, and at Fort Blockhouse for a period of at least a year. Further batches of

electrical artificers will undergo this course until a nucleus of not less than fifteen is available for special posts as instructors, and for duty in flagships and submarine depôt-ships.

That time-honoured institution in the fleet, the divisional system, has come under special consideration since the last issue of the "Annual," and the Admiralty have been contemplating the advisability of adopting certain features which have been tried in various ships. They feel that the experience gained, and the amount of thought and discussion given to the subject, have done a great amount of good which cannot fail to have a lasting effect; in particular, the investigations have served to emphasize in a marked degree the importance of the divisional officer. The Admiralty consider, however, that the introduction of a new and standardized method of internal organization is neither necessary nor desirable. The system of organization of a ship's company in general use in the Royal Navy has been evolved as the result of many years' practice and experience, both in peace and war. While no doubt changes must be made at times, to meet changed conditions, they should, the Admiralty state, be introduced gradually, as hitherto.

Pay, Pensions, and Allowances.

More has been heard again of the suggestions made in 1923 to reduce the pay of the men of the Navy. When in February, 1925, a small committee under Sir John Gilmour, with representatives of the Admiralty, War Office, and Air Ministry, was appointed to consider the question of the pay of new entrants to the three Services, it was explained that this committee had not been set up to carry out the report of the Anderson Committee of 1923 (see "Brassey's Annual," 1924, pp. 24 *et seq.*). The Gilmour Committee was appointed in the first place to consider the question of marriage allowances for naval officers, to inquire what would be the cost of granting them. The larger matter was referred to it subsequently.

Owing, however, to numerous reports in circulation, the Admiralty on August 18, 1925, pointed out that it was definitely announced in the House of Commons on May 26, 1924, on behalf of H.M. Government, that "ratings now serving would continue to receive substantive pay at the Jerram Committee rates during the whole period of their continuous service," and that there is no intention of departing from that decision.

In one mention of the matter in the House of Commons, the First Lord declared that there was no intention of interfering with any existing "contracts." To do so, it may be pointed out, would be to break faith with the men, who were led to believe when the present rates were fixed in 1919 that they were permanent. This being so, it will be hard for the Government to justify the introduction of different rates of pay for men doing precisely the same work. The term "contract" is not the most happy to use in such a connection. The real question at issue is what is just and fair for men who relinquish the rights and privileges which men of the Navy are called upon to surrender. It was after a very thorough investigation that

the Jerram Committee of 1919 gave their verdict on this question, and recommended a scale which gave to the seamen "that just and equitable remuneration which their services so well merit." The aim to-day among certain politicians, with the terrors of war happily past, seems to be, not "just and equitable remuneration," but the scantiest remuneration possible which is compatible with securing enough recruits. They know, as a House of Commons Committee naïvely pointed out in 1923, that "the attraction to boys entering the Service is certainly the attraction of sea life." But the question is not one of obtaining sufficient recruits for the least expenditure, but of retaining a contented and, therefore, an efficient *personnel.*

The 5½ per cent. reduction in naval officers' pay made on July 1, 1924, has been applied throughout the Service. On May 8, 1925, it was announced, with reference to the consolidated and other inclusive salaries paid to officers filling certain appointments, that it had been decided, after careful consideration, that the full reduction of 5½ per cent. actually made is to stand, including those of officers employed in the Naval Ordnance Inspection and other branches, and retired officers employed in the Hydrographic Department.

In the Navy Estimates as introduced in March, 1925, a sum of £350,000 was provided for the grant of an allowance to married naval officers, similar to that paid to officers of the Army and Air Force. On August 5, however, Mr. Baldwin announced in the House of Commons that the Government had made a most careful and prolonged inquiry into the relative position in pay and allowances of all kinds of officers of the three fighting Services, and had reached the conclusion that the position of naval officers, whether married or single, taken as a whole, is not inferior to that of officers in the other two Services. In these circumstances, they considered that no case had been made out for granting the additional allowance.

Keen disappointment was naturally felt at this attitude, particularly after the inclusion of the money in the Estimates had led many officers and their wives to reckon on the allowance. In reference to certain statements in the Press that the allowance had been dropped as one of the proposed economies resultant on the cruiser programme, the Admiralty issued a denial, pointing out the votes and sub-heads of the Estimates on which the required saving was to be effected. From this it was seen that the necessary sum to be raised left the money estimated for marriage allowance complete and intact. The Admiralty were clearly in favour of the allowance, and did all they could to obtain this very just concession, but Treasury influence intervened to perpetuate still further the anomalous state of things under which military and air officers who are married receive a measure of consideration denied to the naval officer.

Turning to existing allowances, only minor adjustments were made during the year. The rates of messing, victualling and provision allowances, etc., were reviewed as usual at the beginning of the financial year on April 1, 1925. While no change was made in the messing allowance of 9*d*. a day, in the victualling allowance of 1*s*. 5½*d*. a day, or in the Sunday dinner allowance of 3¼*d*. a day,

the rates of provision allowance were increased. For officers, the rate was altered to 3*s*. 6*d*. a day, or £56 10*s*. a year, instead of 3*s*. 5*d*. a day, or £55 a year ; and for men (inclusive of long leave allowance) the rate was likewise increased by 1*d*. to 2*s*. 8*d*. a day.

Although the cost of living had gone up, the rise was insufficient to cause an alteration in the scale of the marriage allowance payable to seamen and marines for the financial year 1925–26, which is graded to the nearest ten points. The Ministry of Labour announced the index figure on January 1, 1925, to be 80, and consequently the rates payable for 1925–26 are those shown in the column headed 80 of the official scale. A year earlier, the index figure was 77 and the rates under column 80 were adopted.

On October 3, 1925, lower rates of Navy pay, for new entrants, to take effect from the following day, were announced. In addition to all ratings, the following ranks of officers (entering after October 5) incurred reductions:—Acting sub-lieutenant, sub-lieutenant, mate, and lieutenant, with corresponding grades in Royal Marines.

Promotion and Prospects.

In the executive branch, the half-yearly promotion lists by selection from commander to captain and from lieutenant-commander to commander have remained unchanged during the past year, ten new captains and twenty new commanders being made in each batch. This is no doubt as many as the needs of the reduced fleet justify, but the proportion is very much smaller than before the war. Even with the drastic retrenchment scheme of 1922, the promotion zones remain very crowded. Taking the case of commanders eligible for advancement to captain, it will be found that, at the July, 1925, selection, the zone of from 5½ years' to 8 years' seniority included those who had been promoted to commander between June 30, 1917, and December 31, 1919. The total in this zone was 134. The total a year previously, at the July, 1924, selection, was exactly similar. Only 10 officers, however, were promoted. It is true that several of the 124 remaining ones have other chances of advance later, since each officer may be said to be in the promotion zone for six half-yearly selections. On the other hand, each half-year brings its own additions to the zone. In July, 1925, in addition to the 10 captains promoted, 10 other commanders passed beyond the zone, reducing the total to 114, but at the other end 27 commanders came into the running for the new year selections of 1926. Thus there are always 130 or 140 commanders competing for vacancies which for some years now have been kept down to 10. Only 1 in every 13 or 14, that is to say, at present goes up to the active list of captains. In 1914, the proportion was 1 in every six or seven, as the following figures show. A zone of from 5½ to 8 years in July, 1914, embraced 109 officers, and the number promoted was 17. The heavy promotion lists in the war, of course, helped to accentuate the problem to-day by bringing a surplus of eligible officers into the zones at about the same time. But even when these war promotion lists have been worked

off, the problem must still remain, for it is the perennial one of endeavouring to put a gallon into a pint mug. When the big ship of to-day carries but 1 captain, 2 commanders, and about 16 lieutenant-commanders and lieutenants, it follows that, even with the multiplication of staff and other special positions, it is not an easy matter to legislate for the future of the 16.

An interesting feature of the midsummer naval promotions in 1925 was the advancement of the first officers entered as cadets at Osborne Naval College. Three of these were advanced from the grade of lieutentant-commander—Commanders Oliver Bevir and J. S. Hammill, who were in the first batch, entered at Osborne in September, 1903; and Commander I. W. Whitehorn, who was in the fifth batch, entered at Osborne in January, 1905. A certain number of lieutenant-commanders (E), who had also, of course, entered through Osborne, were for the first time considered for promotion in the list dated June 30, 1925, and on August 6 the Admiralty announced the promotion of four of them—Commanders A. L. P. Mark-Wardlaw, J. P. Charley, J. B. Sidgwick, and G. C. Malden. These officers were in the first two terms at Osborne in 1903–4, were rated midshipmen in 1908, served afloat for over three years, and were promoted to lieutenants between June, 1912, and February, 1913. Not until October, 1913, or at about the age of 23 years, and after some ten years in the Navy, did they go up to specialize in engineering. Nowadays, of course, cadets have to decide whether to specialize before they complete the course at Dartmouth, or, in the case of the public school cadets, before they take the entry examination.

Advancement of Junior Officers.

In consequence of the revised scales for accelerated promotion to the rank of lieutenant adopted in 1923, the rules for the advancement of sub-lieutenants on the retired list and emergency lists have been correspondingly modified. Sub-lieutenants on those lists who were promoted to the rank of acting sub-lieutenant on or after September 15, 1923, will be eligible, at the discretion of the Admiralty, for promotion to the rank of lieutenant from the date on which they would have been due for such advancement on the active list, provided that, to be eligible for promotion before attaining three years' seniority in the lower rank, an officer must have served not less than two years in the rank of sub-lieutenant on the active list.

In May, 1925, the Admiralty decided to introduce revised regulations for the award of time on the results of their examinations to junior officers of the accountant branch. For the batch of paymaster cadets entered on February 1, 1925, and subsequent entries, the order of seniority of each entry on advancement to paymaster midshipman is to be determined solely by the order of merit in the passing out examination from the training ship at the end of their six months' training, and not as formerly by a combination of these results with those obtained in the entry examination. As a further incentive

to obtaining the maximum advantage from their training, paymaster cadets, on passing out of the Thunderer, which is now used for their training as well as that of the special entry cadets, will be allowed to gain time towards their ultimate seniority as paymaster sub-lieutenant—two months for a 1st class (85 per cent.), and one month for a 2nd class certificate (70 per cent.).

Other changes of the year affecting promotion must be mentioned in brief. After October 1, 1926, promotions to the rank of warrant supply officer will only be made from candidates who have passed the educational test and all three subjects of the professional test, and are otherwise eligible. These are the victualling part, the naval store part, and the paper in mathematics. The Naval Supply Branch was established in the autumn of 1922. It was decided that the whole of the old system port division advancement roster should be abolished as from September 1, 1925, except those for the advancement to higher ratings of engine-room artificers, stoker petty officers, all sick berth ratings, and, in the Devonport division only, supply petty officers. The Commanders-in-Chief at the ports are to report in due course when the state of these few remaining rosters has become such as to render it desirable to abolish them. A shortage of officers' stewards and cooks has been apparent during the past year. In January, 1925, 3rd class cooks were ordered to be sent to destroyers or other vacancies for 2nd class cooks, the latter when relieved being drafted in place of 1st class cooks. The maximum period for which officers' stewards, 4th class, are under training in depôt, or in H.M.S. Excellent or Vernon, was reduced by an order of May 15, 1925, from twelve months to nine; and the period of ship experience required for advancement to the 3rd class rating reduced from six months to four. In January, 1925, it was decided to extend the list of ratings eligible for the regulating branch (formerly called ships' police) to corporals, R.M.; and two months later, the branch was thrown open to acting petty officers of all branches, provided they were otherwise eligible under the provisions of Appendix XV, Part I, No. 124, K.R. and A.I.

Uniform, Clothing, and Victualling.

No changes in officers' uniform have been made since the last "Annual," and only minor alterations in the dress of the men. The waistbelt is now a compulsory article of kit for all men dressed as seamen. The knife is a compulsory article of kit for ratings of the seaman branch only, and is optional for other ratings in Class II dress. The white lanyard is still worn by all ratings in Class II dress. In June, 1925, supplies of a new pattern waistbelt, fitted with a money pocket and a spring hook attachment for the knife, were purchased for issue on demand as stocks of the older pattern became exhausted. The clasp knife was ordered to be worn on the belt with working dress; with other dresses the wearing of the knife on the lanyard is optional.

The clothing and bedding gratuities payable to men who re-enter the Navy have been abolished. In future, unless special Admiralty

instructions are issued to any other effect, naval ratings who transfer or re-enter (counting their previous service), are not to be given any free kit, or gratuity on account of kit, unless they transfer to, or re-enter in, a rating the uniform of which is of a different class from the uniform of the rating they last held. In this event, they are to be allowed a free issue of any articles included in the free kit of their new rating which are not in the free kit of the rating they last held. The gratuities payable to naval ratings and marines on leaving the Service, to assist them in providing themselves with plain clothes, were reduced on May 15, 1925, naval ratings, from 14*s*. to 13*s*. 6*d*.; staff-sergeants, R.M., from 26*s*. 6*d*. to 24*s*.; colour sergeants and sergeants from 15*s*. to 14*s*.; and R.M. rank and file, from 11*s*. 6*d*. to 10*s*. 6*d*.

As it is no longer necessary for certain ratings to provide themselves with clothes chests, owing to the fitting of kit lockers in H.M. ships, and as the men require some receptacle for transporting the bulk of their kits, all ratings were ordered in January, 1925, to be supplied with a personal kit bag of the ordinary Service pattern. In future, every new entry is to be supplied with such a personal kit bag under the usual conditions when being kitted up, except that in the case of artificer apprentices the issue is deferred until the completion of training.

In the realm of victualling, the event which attracted most public attention was the substitution, in April, 1925, of cups, pattern 49, and saucers, pattern 87, for earthenware basins in seamen's messes. The change is being effected gradually as the stocks of basins on board ship become exhausted. A new medium-sized spoon, more suitable for use with the cup, is replacing the present seaman's spoon; and an enamelled jug, holding two quarts, to distribute tea from the urns, has been added to the scale of mess utensils for seamen, one being allowed for each mess. In new ships, the design of mess rank is being modified to allow of the stowage of cups and saucers in place of basins.

The victualling of the Navy continues to give satisfaction, and the Naval Canteen Service, connected with the Navy, Army, and Air Force Institutes, has had another successful year. The Naval Administrative Committee of the latter automatically ceased to function as the Canteen Service developed on normal peace lines, and at present the naval section of the Navy, Army, and Air Force Institutes is in charge of a naval accountant officer—Paymaster-Commander Leonard Blackler, C.B.E., as Manager, acting under the General Manager of the Institutes, Mr. Benson, C.B.E. On this important question of victualling, special interest attaches to the bread-making competitions held annually in the Atlantic and Mediterranean Fleets. In the 1925 competition in the Mediterranean, the competitors numbered 39, the largest total that had ever competed in any bread-making contest in the Navy; and only 11 points separated the highest award from the lowest, an indication of the keen rivalry which the contest produced.

II. THE DOMINION NAVIES.

Australia.

Orders for the two cruisers for the Royal Australian Navy, the decision to build which was referred to in last year's "Annual," were placed with Messrs. John Brown & Co., Ltd., Clydebank, in March, 1925, and at the same time, orders for two submarines were given to Messrs. Vickers, Ltd., Barrow. Ten British tenders, it is understood, were made for the work, all very similar; two Australian tenders, from Cockatoo Dock and Walsh Island, were also received for the construction of one cruiser. The decision to place the orders in Great Britain led to some controversy in Australia. Mr. Hughes accused the Premier, Mr. Bruce, of repudiating the policy established sixteen years ago upon the creation of the Australian Navy, declaring that the building of the cruisers in Great Britain was but a modified form of contribution to the British Navy. The saving of £800,000, he affirmed, did not appeal to Australians as a reason, but rather as an excuse.

It was in 1909, it may be recalled, that the Commonwealth provided its own naval dockyard at Cockatoo Island, Sydney, and sent skilled artisans to England to gain practice in ship construction. The first unit of the Royal Australian Navy to be launched in Commonwealth waters was the destroyer Warrego, which, following upon the building of the Parramatta and Yarra in Great Britain, was shipped from the Clyde to Sydney and reconstructed there in 1911. The first cruiser built in Australia was the Brisbane, laid down in 1913 and completed in 1916, and since then another cruiser, the Adelaide, and the destroyers Swan, Huon, and Torrens, have been laid down, constructed, and launched at Cockatoo Island. While capable of shipbuilding work on a fair scale, the Commonwealth Dockyard is affected considerably by the high rates of pay for workmen, and continuous interference by the trade unions, so that production is both protracted and expensive. A succession of strikes so delayed the Adelaide that a public inquiry was demanded.

In all the circumstances, the placing of the contracts outside Australia was natural. To have built them in Australia would, as the Prime Minister said, have involved tremendous capital expenditure and a delay of some years. The British tenders showed that the saving by building the two cruisers in one yard varied from £9,000 to £20,000. For the building of one ship in Australia, three of the tenders were from 68 to 106 per cent. above the lowest British tender. Australian material would have amounted to only 15 per cent. of the total cost of material, because Australia did not manufacture armour-plate, guns, fittings, instruments, and many special items. From a statement of Mr. Bruce, issued on April 7, 1925, the following may be quoted for the light thrown upon shipbuilding economics as they concern the Dominions :—

After carefully examining whether the placing of the order in Australia would constitute a step towards establishing a new Australian industry and stimulate existing industries, the Government concluded that these objects would not be achieved.

The future of the industry must depend on a steady demand, and, apart from international obligations, obviously Australia could not afford to embark on a naval programme which would keep the yards continuously employed. The principal objection, however, lay in the fact that the Government was the only source from which the yards could expect orders, and the attitude of Labour towards defence in general, and naval defence in particular, made it extremely unlikely that the industry would receive even that measure of support which circumstances permitted and safety demanded.

The only direction in which it would appear that Australian industry might be stimulated was in the rolling of steel plates, which to-day were not produced, but the plates for a cruiser taking three years to build could be rolled in six weeks, and an expensive plant would be left idle for a long period. It was unsound to suggest that naval construction would stimulate commercial shipbuilding as the work was entirely different.

The Government had also considered very seriously the question whether it was essential to place the order locally in order to afford skilled artisans an experience that would enable them to effect future repairs, but examination showed that, since the work would be more of assembling than of constructing, the experience gained on the cruiser would be little more than that to be gained on the seaplane-carrier which was to be constructed in Australia.

On June 1, the Australian High Commissioner in London, Sir Joseph Cook, announced that the cost of the hull and machinery for each cruiser would exceed £1,000,000. The ships will be similar to the five " County " class cruisers under construction for the Royal Navy, and Messrs. Vickers, Ltd., and Messrs. Armstrong, Whitworth & Co., Ltd., will each supply the main armament for one ship. Contracts for the gun-mountings, at approximately £350,000 to each firm, were placed ; and the armour contracts, at a total cost for both ships of over £100,000, were divided between Messrs. Beardmore & Co., Ltd., Messrs. Cammell, Laird & Co., Ltd., and Messrs. David Colville & Sons, Ltd.

In regard to the submarines, Messrs. Vickers, Ltd., announced on May 20, the confirmation of the order to build them. It is understood the new vessels will have a cruising radius of 3,000 miles. No firm has had so much experience of submarine construction as Messrs. Vickers, the first submarine in England having been launched at Barrow in 1886, and the first for the Royal Navy in 1901. Details of the seaplane-carrier to be built in Australia have not yet been made known in this country.

The Royal Australian Navy continues to prove its efficiency, and has done much cruising during the past year with satisfactory results. The cruiser Adelaide came to England with the ships of the Special Service Squadron, and her ship's company were entertained in London as guests of the Admiralty on October 1 and 2, 1924. After a refit, the vessel left Portsmouth on January 10, 1925, and during the first week of March was present at the gathering of ships from the East Indies, China, Australia, and New Zealand Stations at Singapore, for the Admirals' Conference.

The sloop Silvio was refitted at Pembroke Dockyard during 1925 as a surveying ship for the Royal Australian Navy, and commissioned on June 20, when she was renamed the Moresby, after Admiral John Moresby, whose discoveries in the 'seventies of the last century, when commanding the Basilisk, were of great value to Australia and the Empire. The older destroyers of the Royal Australian Navy are now in use as training ships for the citizen Naval Reserves. These

vessels are the Huon, at Hobart; the Swan, at Launceston; the Swordsman, at Sydney; the Torrens, at Adelaide; the Warrego, at Brisbane; and the Yarra, at Geelong. The sloop Marguerite serves as sea-going training ship.

The plan of interchanging cruisers between the Imperial and Australian Fleets has been adopted with success during the past year. When the Adelaide returned to the Commonwealth in the spring of 1925, she was accompanied by the cruiser Concord, from the Mediterranean, which served for about three months with the Australian Navy. Meantime, the Australian cruiser Brisbane was lent to the China Squadron of the Royal Navy. In November, 1925, the Brisbane was lent for a second period of service, this time with the Mediterranean Fleet, returning to Australia in July, 1926, and simultaneously, the cruiser Delhi, from the Mediterranean, was to serve for six months in Australia.

New Zealand.

It is fitting to refer here briefly to the loss which the cause of Empire defence sustained by the death of Mr. Massey, the doyen of the Dominion Premiers and a warm champion of the Navy. His place in the councils of Empire is not easily filled. Among his last announcements as Prime Minister of New Zealand was one referring to the decision to maintain a second cruiser. The vessel chosen for this service is the Diomede, which was relieved in China in July, 1925, and returned to Portsmouth to pay off in September, recommissioning later for the New Zealand Station. The Diomede is a sister-ship of the Dunedin, already there.

South Africa.

The South African Naval Service has made a good start on sound lines with a minesweeping and surveying force, in which the nucleus of a body of seamen can be trained. At the opening on June 4, 1925, of the new graving dock at Durban, one of the three largest in the world, by the Prince of Wales, the first ship to enter the dock, having on board the Prince and the Commander-in-Chief, was the surveying vessel Protea.

The training ship General Botha, formerly the cruiser Thames, has been inspected by the Commander-in-Chief on the Africa Station, and has secured very favourable reports. In his report dated November 28, 1924, Vice-Admiral Sir Rudolf Bentinck suggested that, as the ship had been some four years out of dock, endeavour should be made to have her dry-docked in the near future for examination of her bottom and under-water fittings. At the beginning of June, 1925, the General Botha was removed from her moorings, for the first time since her establishment, for this work to be done.

Canada.

The past year has been, to outward appearances, an uneventful one so far as the Canadian Navy is concerned. The composition of

the Service has been unchanged. Good work in the way of training has been accomplished, and in this connection mention should be made of the excellent report won by the 2 officers and 38 ratings of the Canadian R.N.V.R. who served in the Hood and Repulse for 33 days during the voyage of the Special Service Squadron from Vancouver to Halifax. "Their behaviour throughout," said Vice-Admiral Field, "was exemplary, and their zeal, general conduct, and appearance a great credit to the Royal Canadian Naval Volunteer Reserve." In communicating this letter, the Department of the Naval Service added an expression of its entire satisfaction with the work of the contingent, and observed that it was assured that the zeal displayed by the comparatively small number of men embarked was a reflection of the high state of efficiency of every company and half-company of the R.C.N.V.R.

Mention may also be made of the high standard of seamanship and devotion to duty displayed by the crew of the minesweeper Thiepval, under Lieutenant Roy Beach, R.C.N., with Lieutenant Arthur Pressey, R.C.N., as first lieutenant, in the voyage across the Pacific to Japan in connection with Squadron-Leader MacLaren's attempt to fly round the world. The Thiepval covered over 10,000 miles, many of which were in dangerous and uncharted seas, and but for her the four gallant airmen might have been stranded for several months on the bleak, semi-civilized Behring Island, waiting for the annual steamer. It was unfortunate that the sister-ship of the Thiepval, the Armentières, was sunk on September 3, 1925, after striking a rock on the west coast of Vancouver Island, happily without loss of life.

The present composition of the Canadian Navy—the cruiser Aurora being laid up at Halifax—renders an exchange of ships such as that carried out between the Royal and Australian Navies impossible; but as opportunity offered the two Canadian destroyers in commission for training purposes have worked with Imperial ships. The Patriot cruised in company with the Eighth Cruiser Squadron to Bermuda early in 1925, and the Patrician accompanied the Capetown on a voyage to Pacific ports.

Chas. N. Robinson.

CHAPTER II.

Foreign Navies.

The Washington Naval Treaty is still casting its shadow over all the foreign naval Powers. Even those countries which were not parties to the naval pact have so far shown no inclination to lay down either capital ships or aircraft-carriers. On the other hand, great activity is being shown in the construction of cruisers, destroyers, and submarines.

UNITED STATES.

In the autumn of 1924 there was a brisk controversy in the American Press, turning upon the strength of the Navy; the need for elevating the guns, against which Great Britain had raised a note of protest; and the question whether the provision and control of aircraft should be separated from that of other weapons of the Army and Navy. The discussion was taken note of by President Coolidge, at whose instigation a special inquiry * was undertaken by the General Board. The following were the terms of reference :—

"You will consider recent developments in aviation for the purpose of recommending a policy with reference to the upkeep and development of the Navy in its various branches, *i.e.* submarines, surface ships, and aircraft, with particular reference to the appropriations to be made at the coming session of Congress for these branches of the service. In connection with your investigations you will seek information from experienced officers of both Army and Navy."

Captain Gherardi's Plea.

Before the Board had held many meetings, Captain Gherardi, Mr. Wilbur's chief naval assistant, laid great emphasis on the essentially auxiliary rôle that an air force must play in naval warfare, and made a careful and scientific review of its real purposes.

This officer, obviously reflecting the opinion of the highest naval authorities, concluded that aviation could not be dissociated from the Navy without "irredeemable harm to that portion of the nation's defence." He insisted that to attempt to operate planes over the sea and coastal areas without support and co-operation of the surface

* Its members were: Admiral Eberle (Chairman), Major-General Lejeune, Rear-Admirals Williams, Jones, Strauss, Long, and Phelps, Captain Hough and Commander Smyth (Secretary).

and submarine craft would lead to inefficiency in the services concerned. Finally, Captain Gherardi drew the following deductions :—

"1. Aviation advance does not justify us in allowing our eighteen battleships, or any of them, to deteriorate or to be put out of commission, using money thus saved to build up aviation.

"2. Types of aircraft: (a) flying boats for long-range scouting and bombing; (b) amphibians and single pontoon planes for spotting fighting planes, and as bombing planes for close protection of the fleet against submarine or destroyer attacks; (c) twin pontoon planes for torpedo planes, but these should be considered as secondary to the first two.

"3. Increased anti-aircraft armament, particularly powerful machine guns. Better aircraft spotting instruments and arrangements. Increased deck protection.

"4. Aircraft-carriers must be a part of the fleet until such time arrives, if ever, that aircraft shall have such air and seagoing qualities that they may always be available under their own power with the fleet.

"5. The destroyer leader has been a long-felt want. We use scout cruisers for this function now, but the scout cruiser could not be spared for this purpose in war-time.

"6. The hazards of war include storms of varying intensity; likelihood of planes being separated from their carrier by fog, or by the enemy's action in forcing the carrier to seek refuge in flight, or by damaging her by gunfire so planes cannot land. Fog and sudden storms, especially West Indian hurricanes or East Indian typhoons, are more or less easily weathered by surface craft, but are destructive to planes.

"7. Aircraft of the long-range flying boat type would be greatly facilitated in their use if operated in connection with destroyers such as are already built.

"In general, then, up to the present time, the advent of aircraft, as in the case of the torpedo boat and the submarine, has added one more weapon to the sea forces without relieving them of any that have preceded it."

New Construction Approved.

When Congress met in December it first considered a Bill for the construction of new vessels and passed it without delay. Authority was given for building eight cruisers, and six submarines; and for the conversion of six battleships—the Florida, Utah, New York, Texas, Arkansas, and Wyoming—from coal to oil burners. The turret gun question was, for the moment, left on one side. Senator King raised his old contention that nothing should be authorized until the state of the Navy had been made the subject of a general inquiry; but his motion was defeated in the Senate Committee.

The more contentious parts of the Navy Department's programme were embodied in a Bill brought forward by Mr. Britten, of the House Naval Committee. He proposed that authorization should be given for building four scout cruisers—in addition to those already provided for; for raising the turret gun elevation of thirteen battleships; for building a floating dock; and for voting an additional $10,000,000 to the two aeroplane-carriers, Lexington and Saratoga. Mr. Britten made a long speech when he placed his Bill before the House, urging once more that the United States Navy was not the equal of Great Britain's, and that its deficiencies should be made good. His Bill was automatically referred to the Navy House Committee.

Adoption of the Naval Budget.

Congress eventually passed a very ordinary naval budget. The total appropriations, including unexpended balances from previous financial years, amounted to some £84,000,000. Provision was made

for a naval *personnel* of 86,000 men and for a marine corps of 18,000 officers and men; $9,000,000 was allotted to modernizing six older battleships by giving them additional protection against submarine and air attack, by converting them from coal to oil burners, and by installing a new fire control system in each. Provision was also made for new construction; so that the present state of American building may be summarized as follows:—

New ships authorized by statute.	New ships provided for in the 1925–1926 Budget.
2 aircraft-carriers.	2 aircraft-carriers.
8 cruisers.	2 cruisers.
8 submarines.	4 submarines.
12 destroyers.	1 submarine tender.
1 submarine tender.	6 river gunboats.
6 river gunboats.	

Nothing was voted for altering the elevation of the turret guns, and, indeed, the papers were announcing generally that the project was dead.

The extent to which Congress has revised the proposals of the Navy Department can only be fully realized by comparing their legislation with the official report of the Secretary of the Navy, issued just before Congress assembled. In it, Mr. Wilbur urged that money was required for repairing and maintaining the fleet, and for increasing the enlisted *personnel* by 3,000 men; and reported, moreover, that the material condition of the fleet was not satisfactory. As Congress ignored his pleadings, it must be assumed that he failed to carry conviction. On the other hand, the intervention of naval officers, some of them of high rank, in the controversy was resented by members of Congress and undoubtedly stiffened the opposition to action on the lines suggested by the Department. Senator Huddleston expressed himself with remarkable emphasis on this issue: "Naval officers," he wrote, "are becoming publicists instead of military men, and are the most skilled orators and accomplished writers to be found in any profession."

Trials with the Battleship Washington.

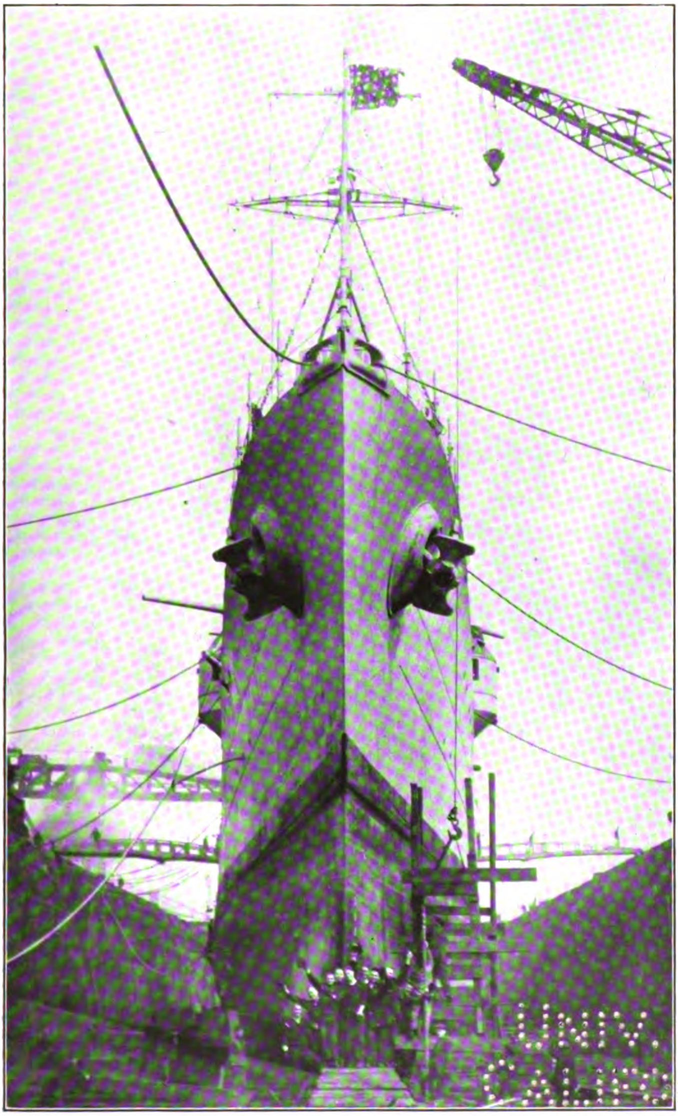
Among the vessels marked down for scrapping under the Washington Treaty was the battleship Washington. She was launched in 1920, and had been designed to incorporate all the lessons which the war had taught. Her armoured decks, compartments, and subdivisions were supposed to fulfil all possible requirements with respect to protection against plunging fire, and under-water attack. The Navy Department decided that if a vessel of this kind were exposed to aeroplane attack, the results would be far more instructive than those obtained against the older battleships previously used for the same purpose. Early in the year, therefore, the Washington was towed out to a sea anchorage and the experiments were carried out. The results obtained were important and interesting, and are referred to by Admiral Niblack in his article on "Byproducts of the Washington Conference," elsewhere in this volume.

Congress has, indeed, been much occupied with various naval problems. It is not necessary to summarize the very lengthy cross-examination of experts undertaken by the Select House Committee on the Air Service matters. Admiral Sims, General Mitchell, and many other officers of high standing had all given evidence; and the Committee had been quite unable to come to any definite conclusion. "Most of the difficulties in the controversy of this winter," wrote Representative Swing of California, "were caused by the extreme bias of the partisans. The airman spoke of the battleship as it is to-day, and disparaged it in relation to his conception of the aeroplane ten years from now. Similarly the naval officer, familiar with plans for the future development of the battleship, with its protected decks and heavy armour, spoke of the conflict between the present type of aeroplane, as compared with the battleship as it will be in ten years." The matter was still open when Congress adjourned, Mr. Curry having announced his intention to re-introduce his bill for a separate air service.

The General Board's Report.

In the middle of February, too late for the Congress men to take the matter up, the General Navy Board presented its report. This document will probably be the starting point of all American naval programmes for the next decade. Its real purpose was, as the papers stated when the Board assembled, to formulate a new naval policy for the United States; and it would be impossible to exaggerate its importance as a political document. The report was divided into general conclusions and specific recommendations for the future. On the first head they decided that "Sea power is necessary to the commercial life and prosperity of a nation that is engaged in overseas commerce, and that the three most important elements of sea-power are: (*a*) a powerful and efficient navy; (*b*) properly equipped and defended bases for the use of the fleet in areas where hostilities may occur; and (*c*) a merchant marine adequate to the task of carrying the nation's trade, and supplying its fleet in time of war. . . . The policy consistently urged by the Navy Department is sound, *i.e.* to create, maintain, and operate a navy second to none, and in conformity with the ratio for capital ships established by the Treaty limiting naval armament."

On the question of air power, the report was decisive. "Aircraft cannot operate from territory that is not controlled by the military or naval forces of their own country"; and are "unable to occupy territory or exercise command of the sea." For these and other reasons, the Board considered the "battleship to be the element of ultimate force in the fleet," and urged that the battleship of the future could be so designed as to be "protected against fatal damage from the air." An armoured deck six to seven inches thick, and a satisfactory system of watertight subdivision would, it was suggested, probably solve the problem. "It cannot be said, therefore, that air attack had rendered the battleship obsolete."



(*General Photographic Agency.*)

U.S. LIGHT CRUISER MEMPHIS.

(*Constructed by William Cramp & Sons, Philadelphia.*)

As might be expected, the Board did not take the arguments for a separate air service very seriously.

"It is assumed by some that because the Army operates on the land and the Navy operates on the sea, the Air Force can be operated independently of either. . . . It has been claimed by certain witnesses, who appeared before the Board that a separate United States air force, if aided by submarines, could, by seizing bases at proper distances, carry on an offensive campaign against European and Asiatic Powers. While respecting the professional abilities and opinions of such witnesses, the Board is unable to regard their claims seriously."

On this account, it was considered that the separation of aviation from the Navy, and its incorporation in a separate department of the Government, "would be most injurious to the continued efficiency of the fleet, and the performance of its mission."

A Fleet "Second to None."

The positive recommendations of the Board were, with reference to general naval policy, of a specific character. It was claimed in regard to battleships that the Treaty strength should be maintained; "keep modernized under the Treaty; apply, under Treaty, every device or change that will increase effectiveness of weapons; keep in high state of organization and training." Turning to other types, it was urged that "the tonnage strength based on a 5 : 5 : 3 ratio" should be maintained in cruisers, destroyer leaders, destroyers, and fleet submarines, and that there should be as many aircraft-carriers as the Treaty allowed; while as to aircraft the recommendation was, "Maintain in numbers, in performance, and in *personnel* as required to insure a 5 : 5 : 3 ratio in naval air strength." Finally, the submission with reference to tenders and auxiliaries was, "provide and maintain as required to support the combatant forces."

Towards the accomplishment of the policy embodied in this general naval scheme it was recommended:

"(*a*) That the six coal-burning battleships, New York, Texas, Wyoming, Arkansas, Utah, and Florida, be modernized, as authorized by Congress, without delay.

"(*b*) That the seven battleships, New Mexico, Mississippi, Idaho, Pennsylvania, Arizona, Oklahoma, and Nevada, be modernized, as allowed by the Treaty, as soon as possible.

"(*c*) That the eight 10,000 ton cruisers, already authorized by Congress, be built without delay.

"(*d*) That the three remaining fleet submarines, already authorized by Congress, be laid down during the fiscal year 1927.

"(*e*) That a progressive and adequate airplane building programme be authorized to insure to the fleet a complete outfit of up-to-date planes, with 50 per cent. replacements in reserve, as well as the necessary training planes, at a total expenditure for the first year of twenty million dollars.

"(*f*) That the completion of the aircraft-carriers Lexington and Saratoga be expedited.

"(*g*) That an aircraft-carrier of about 23,000 tons be authorized and laid down without unnecessary delay.

"(*h*) That the twenty-year Navy building programme prepared by the General Board be authorized.

"(*i*) That the course in aeronautics at the Naval Academy be extended.

"(*j*) That in the future, graduates of the Naval Academy be assigned to aviation duty, for qualification as pilots or observers, in so far as the other requirements of the service will permit, after they have completed at least two years' sea service.

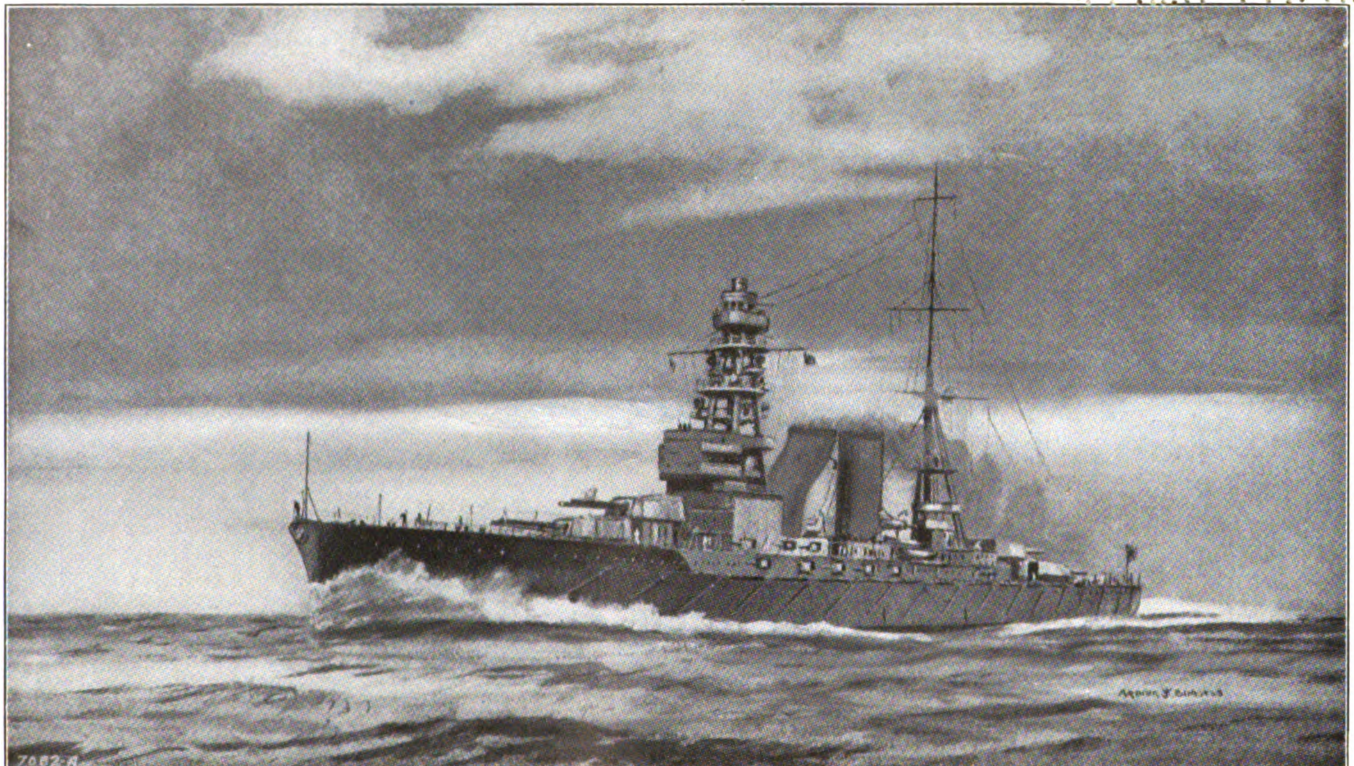
"(*k*) That the Navy Department establish a definite policy to govern the assignment of naval *personnel* to aviation duty, the length of such assignment, and determine their obligations to their other naval duties."

As neither the American nation nor Congress has, as yet, had time to consider this report, comment may well be deferred. Experience suggests that there is a wide difference between what the Navy Department recommends and what Congress accepts; but, in effect, the report is substantially a re-affirmation of the policy which the Navy Department has urged for some years past—that, in all respects, the United States Navy should be "second to none." In this connection, the report suggests the general reflection that a nation's strength at sea cannot be calculated independently of geographical, economic, and political considerations. The underlying purpose of the Washington Treaty—and this is apparently the view of the American President—was that it should give each of the three principal signatories a guarantee of security against aggression. Security, however, has different meanings for America and Great Britain; and the naval and military forces necessary for ensuring it vary with the political and strategical implications. To an American statesman security means freedom from fear of invasion, and power to hold the Hawaiian islands and the Panama Canal against any possible adversary; to a British Government it means freedom against attack upon the country itself, or upon its colonies, or upon the ocean highways which give the Empire such cohesion as it possesses.

The Fleet Manœuvres.

The principal naval manœuvres for the year took place in Hawaiian waters. The joint problem in the study of which the Army and Navy took part was designed to practise the fleet in carrying overseas expeditions to a distant objective, and to test the defences of Oahu, the island on which the naval base of Honolulu is situated. The attacking, or blue force, consisted of two divisions of troops escorted by eleven battleships, six light cruisers, fifty-six destroyers, one aircraft-carrier, and a flotilla of submarines; the defenders (black) were the local garrison of Oahu and the naval forces of the Fourteenth District, that is ten submarines of the "R" class (500 tons) and a few auxiliaries. The underlying assumption was, therefore, that the naval base at Pearl Harbour had been completely isolated, and that the garrison could not count on assistance from a fleet of surface vessels, capable of fighting, or even harassing the blue fleet.

The blue fleet left San Francisco on April 15, and the exercises began ten days later. The blue commander decided not to launch an attack direct against Oahu, and so seized Molokai and Lanai, where he established air bases to reconnoitre and get some idea of the dispositions made by his opponent. The defence forces were too weak to resist the landings made at these outlying islands; but the defending submarines and aeroplanes succeeded in sinking an auxiliary belonging to the blue forces. The aeroplane-carrier Langley was kept well out of the way until the islands were in "blue's" hands.



(*From a drawing by Arthur J. W. Burgess.*)

JAPANESE BATTLESHIP NAGATO, SHOWING MODIFIED FORWARD FUNNEL.

THE LANDING OF THE TROOPS.

The " black " commander's forces were quite unequal to holding all possible landing places in force, and were distributed on the assumption that the principal attack would be delivered against the west coast of the island. The " blue " commander, having made sure that his opponent had distributed his forces in this way, laid his plans accordingly. He made a naval demonstration off the south coast of the island on April 26, which did not, however, deceive the " black " commander or make him alter his plans ; and then, some time before daybreak on the 27th, he launched two simultaneous attacks upon the north and west coasts. The attack against the west coast was intended merely to hold the bulk of the black forces, and keep them from reinforcing the defenders on the northern side. It was repulsed ; but apparently succeeded in its main object, for the landing on the northern coast was successful. The defending force was driven in, and the attackers made good their foothold.

No details have been published of the distribution of the naval forces which covered the landings or of the tactical incidents of the fighting. General Hines, the chief umpire, has announced that the exercises have " disclosed deficiencies " in the defences of Oahu ; and doubtless the Press will take the matter up later. It would, in any case, be difficult to discuss these manœuvres at length, as their general scheme is not one which corresponds to any possible contingency.

JAPAN.

The Japanese Navy has passed through a normal, uneventful year. There have been no discussions of any importance in the Chamber or the Diet ; and the fleet has carried out its ordinary duties. In July, 1924, the First and Second Fleets did their battle practice in Sayeki Bay, and used the battleship Hizen (ex-Russian Retvisau) as a target ; at the same time the battleship Iwami (ex-Russian Orel) was bombed and sunk. In September, 1924, the battleships Satsuma and Aki, on the scrapping list of the Washington Treaty, were sunk by the gun fire and torpedoes of the battle-cruiser Kongo and the battleships Nagato, Mutsu, and Hyuga. In the following month, the fleet carried out its grand manœuvres for the year. The general plan of the manœuvres was that a squadron, composed almost entirely from ships in reserve, should defend the approaches to the Japanese islands against a superior enemy approaching from the south. The attacking force consisted of the First and Second Fleets at full complement. The results of these manœuvres, in accordance with the policy usually adopted by the Japanese naval authorities, were not published.

Ships Completed and Launched.

The progress of Japanese constructions and completions is best shown in comparative tables :

1. Completions during the Year 1925.

	Number.	Name.	Characteristics.
Cruisers .	. 1	Abukuma	5,570 tons ; 33 knots : 7 5·5″.
Destroyers .	. 1	No. 17	Of the 1,400 ton type.
Submarines .	. —	—	—

2. Launchings.

	Number.	Name.	Remarks.
Cruisers .	. 3	Naka, Furutaka, Kako	Abukuma type.
Destroyers .	. 4	Nos. 13, 21, 23, and 27	1,400 ton type.
Submarines .	. 3	Nos. I.2 and I.3	Over 1,000 ton type.
		No. Ro.68	Under 1,000 tons.

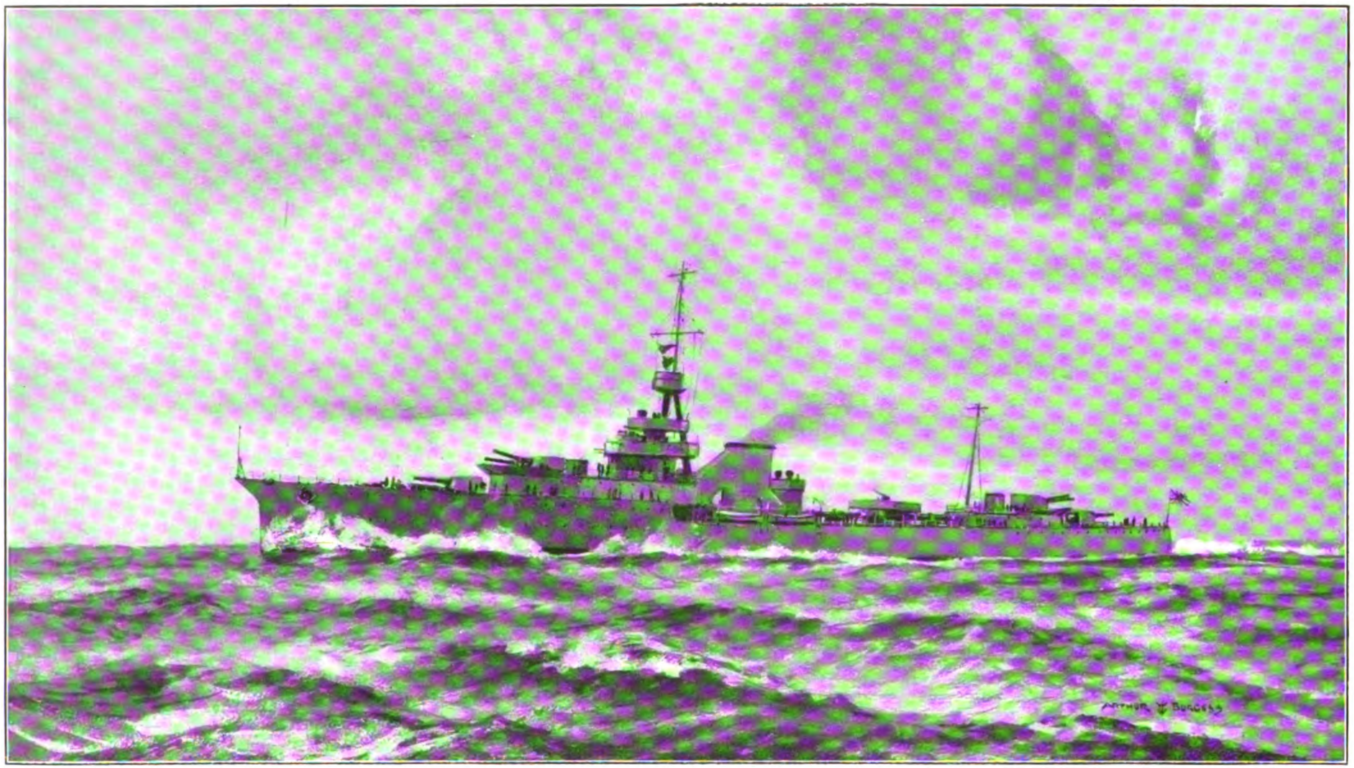
3. Under Construction.

	Number.	Name.	Remarks.
Cruisers .	. 4	Aoba, Kinugasa	7,100 ton type.
		Nachi, Myoko	10,000 „
Destroyers .	. 5	Nos. 28, 29, 30, and 31	1,400 ton type.
Submarines .	. 9	—	6 over 1,000 tons.
			3 under 1,000 tons.

During the past year Japanese naval policy has been very much discussed in America and Great Britain, and it may be well to review the building programme and its implications. The first point to settle is what will be the composition of the Japanese fleet when the programme is complete or nearly so ? In contradistinction to the action of the British and American authorities, Japan proposes to support much the same numerical strength in cruisers as she possessed before the war, replacing obsolete vessels by new ones of greater power. On the other hand, Britain, which had 126 built and building in 1914, will have only 57 ; while the United States, in place of 30, will possess in 1928 only 24 of less than 20 years old.

As regards destroyers, Japan has 8 building and 15 projected. In the matter of submarines, though only 10 submarines are either due, or overdue, for replacement, 28 are either under construction or projected, representing a total increase of 18 boats. The inference is that the Japanese Government, having abandoned the plans which it entertained before the Washington Conference in respect to capital ships, intends in all other respects to keep the fleet at, and in some details above, its pre-war strength. Attention is being concentrated on cruiser, destroyer, and submarine construction, of which more units have been laid down in Japanese shipyards since the Armistice than in any other country. Incidentally, the programme is supporting the important armament industries which had just been organized on a most efficient scale when the Washington pact was concluded and is giving employment to a large volume of skilled labour.

An indication of the attitude of the Japanese naval authorities



(*From a drawing by Arthur J. W. Burgess.*)

JAPANESE LIGHT CRUISER YUBARI.

(*Constructed at Sasebo Dockyard, Japan.*)

to the design of cruisers is supplied by the following particulars of the Furutaka, which was recently launched at Nagasaki :—

Length	580 feet.
Breadth	50 feet 9 inches.
Displacement	7,100 tons.
Speed	33 knots.

Armament : six 8-inch guns, three 12-pdr. A.A., two machine guns.

As regards the 10,000 tons cruiser class, of which two have been laid down and two more projected, it is suggested that there is some doubt about the number of guns—twelve 8-inch—in the Admiralty Return of Fleets, because such a number might be too heavy for ships of this displacement. Eight, or at the most ten, may prove to be the correct number.

Disposition of the Fleet.

The First Japanese Squadron consists of the battleships in full commission, of two fleet cruisers, and three destroyer and two submarine flotillas ; the Second Fleet, consists of the three battle cruisers, of four light cruisers, three destroyers, and three submarine flotillas. These forces, brought up to full strength by vessels taken from the reserve, would obviously have the duty of defending Japanese waters, and keeping any possible opponent from establishing its naval forces upon the vital communications between Japan and China. The presumption is that Japan proposes that very large detachments of submarines and destroyers shall be stationed in the approaches to Yokohama and Osaka, where the bulk of Japanese trade is concentrated, while a further deduction will probably be made for fishery defence.

FRANCE.

Some time after taking office under M. Herriot's Government, M. Dumesnil, the new Minister of Marine, gave his views upon naval administration to a number of Press representatives. His words made it quite clear that he differed from his predecessors on the vexed question of State arsenals. The former Government had introduced a law for cutting down the number of State owned factories and dockyards ; and for turning over the Rochefort Arsenal to private industry. M. Dumesnil intimated that he would withdraw this bill and replace it by another. As the *cartel des gauches*, to which M. Herriot's Government belonged, depended upon the support of men deeply pledged to State-owned industry, M. Dumesnil's critics attributed his decision purely to political prejudices. In point of fact, absolutely technical opinion, uncoloured by any political theory, had been much divided on the subject ; and when M. Dumesnil decided to keep Rochefort as a State arsenal, he could undoubtedly reckon upon a large measure of naval support. The new Minister then expressed himself in favour of what may be called long-term building programmes. This also had for some time been a much debated point in French naval policy. Long ago,

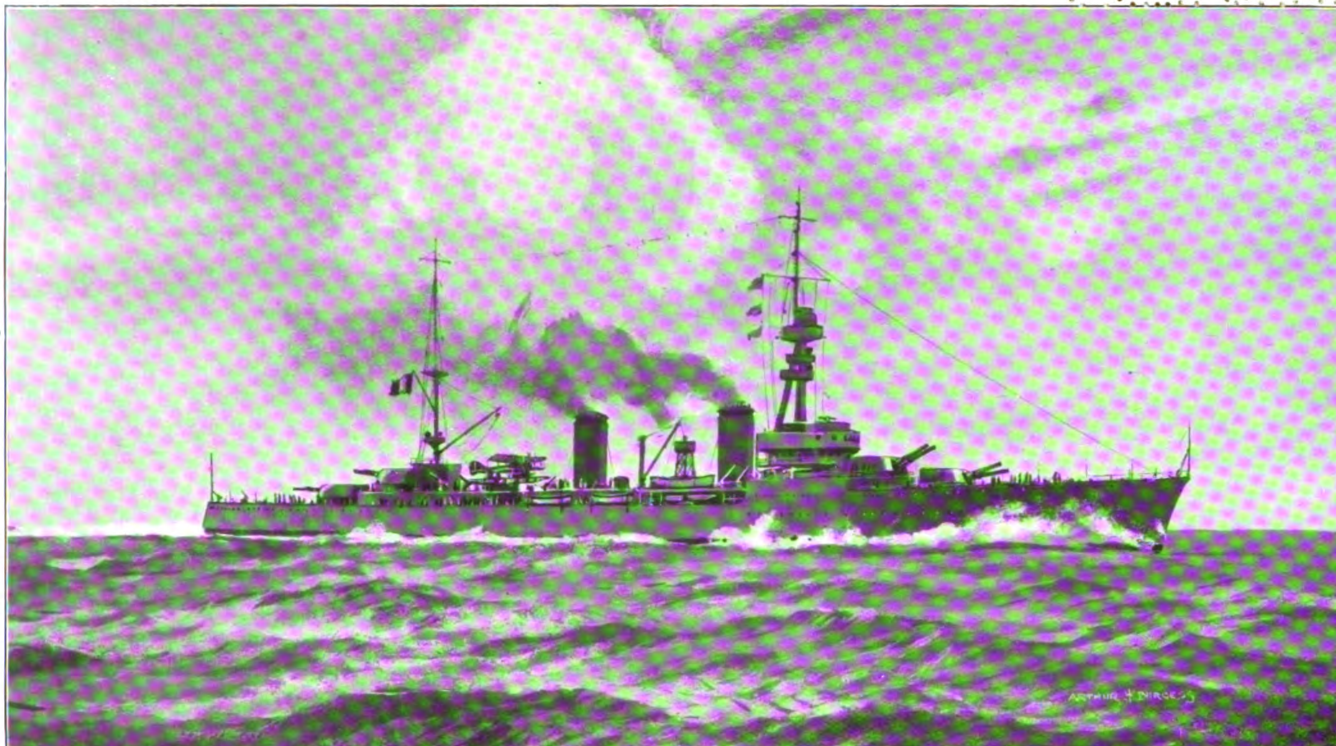
M. Delcassé described a long-term building bill as a means of placing French naval defence upon a constitutional basis, that is, free of Ministerial changes and Government crises. Since then, however, many eminent men, amongst them M. Laubeuf, the submarine designer, have criticized the principle of passing a "statut naval," to which effect can only be given in fifteen or twenty years.

New Naval Organization.

M. Dumesnil soon gave proof of the energy with which he was ready to perform the duties of his office. After a tour round the great arsenals, he presented a bill to Parliament for reorganizing the coastal defence of the country. By a previous bill the coasts of France had been divided into four districts, known as maritime frontiers, and a vice-admiral placed in charge of each. By the new bill posts were suppressed; and the old prefets maritimes of the six arrondissements maritimes were made responsible for the coastal defence within their commands. In peace time, the prefets are directly responsible to the Minister of the Marine; but in war, they act under the fleet commander based on their chief arsenal.

The fleet is now divided into two commands: the naval forces of the north—at present under Vice-Admiral Docteur—and the naval forces of the Mediterranean—Vice-Admiral Dumesnil. These commanders-in-chief have supreme control of the sea-going squadrons, the patrol forces, and the fixed and mobile coast defences within their commands. As the commander-in-chief of the northern forces has a much longer seaboard to look after than the commander-in-chief of the Mediterranean, an additional vice-admiral has been appointed for the Atlantic coast (2nd, 3rd, and 4th arrondissements maritimes). The headquarters of the commanders-in-chief of the maritime frontiers at Dunkerque, Lorient, Marseille, and Algiers are thus closed down.

This scheme of dovetailed responsibilities is the result of making the Navy solely responsible for the coastal defences of the country. States with a predominating naval armament, like Great Britain and the United States, generally adopt a plan of double responsibilities; the naval commander-in-chief commands at sea and the local army commander on land. This plan of coast defence rests, however, on the supposition that the naval forces are the first line of resistance against a raid or landing; and that a successful defence will be one which brings the naval forces of the landing expedition to action, and either destroys them or drives them off. So long as the naval forces of the defending side can count on a preponderance of strength, this system of commands is doubtless the most logical. Powers with naval forces which are weaker than those of a possible adversary cannot adopt it. Countries threatened with a raid or landing, backed by a powerful naval adversary, must be ready to defeat the expedition *in situ*. The French have for this reason placed all their coastal defences, whether they be naval squadrons or shore batteries, in the Navy's hands, and M. Dumesnil's bill has been passed with a view to making the system as simple as possible.



(*From a drawing by* ***Arthur J. W. Burgess.***)

FRENCH LIGHT CRUISERS DUQUESNE AND TOURVILLE.

(***Built****, respectively, at* ***Brest*** *and* ***Lorient Dockyards.***)

The Navy Estimates.

The naval estimates for 1925 were presented towards the end of the year. The total was slightly greater than that of the previous year; and the Minister gave the Chamber a very comprehensive survey of his financial policy. The chief items in his programme were: (i) the modernizing of the battleships; (ii) giving the coastal batteries a proper defence against aircraft; (iii) reduction of the officers and men serving ashore; (iv) the improvement of the ports and arsenals; and (v) the reorganizing of the naval air service.

The improvements to the battle fleet will be completed during 1926, when the Bretagne, the last of the battleships to be taken in hand, will have the range of her turret guns increased, and will be fitted with a new fire control apparatus.

M. Dumesnil's proposals with regard to the arsenals dealt solely with their material installation. At the present time work is in progress in regard to a torpedo-testing establishment at Brest; a new foundry at Indret; a torpedo and mine depôt at Mourillon; the improvement of the installation at Ruelle; new magazines and new ships at Cherbourg; a new machine shed at Toulon, and new oil reservoirs at all the principal dockyards and bases.

Organization of the Dockyards.

The Minister laid emphasis upon the importance of carrying out these various improvements without delay. These material alterations are, however, only part of the much larger problem of dockyard reorganization; a question which has provoked much able discussion during the year. The principal contribution has been made in the pages of the *Revue Maritime*, by M. le Commissaire Principal Combescure. In his view, the root of the difficulty is that the work of the dockyard branch at the Ministere de la Marine is not co-ordinated with that of the arsenals themselves. The solution he offers is that of making a complete and exhaustive catalogue of all dockyard work, whether technical or administrative; and of grouping it into appropriate departments which shall exist, as it were, in duplicate, at the arsenals themselves and at headquarters in Paris. M. Combescure's system is virtually the same as that which prevails in Great Britain. It is certain that the existing system is very wasteful, and that the dockyards and shore establishments absorb too great a proportion of the total naval expenditure.

On the head of the naval air service, M. Dumesnil stated that new naval aviation stations were necessary, and that the existing service required reserve machines and motors, to replace those lost during the first four months of war. He made the interesting admission that, for four months after mobilization, there would be no deliveries and the service would have to supply itself from its own stocks. The debate upon the estimates provoked no serious criticism; the general view of the Chamber was that France's

present naval weakness was deplorable, and that there must be no serious opposition to any reasonable expenditure. A change of Government made no difference in the policy of ministers or the attitude of the deputies.

Strength of the Fleet.

M. Dumesnil was thus able to present his "naval statute" to a friendly Chamber. It did not differ greatly from Raiberti's bill of 1923, and provided for a French fleet of—

175,000 tons of capital ships.
60,000 tons of aircraft-carriers.
360,000 tons of cruisers, flotilla leaders, and destroyers.
96,000 tons of submarines, exclusive of submarines for coastal defence.

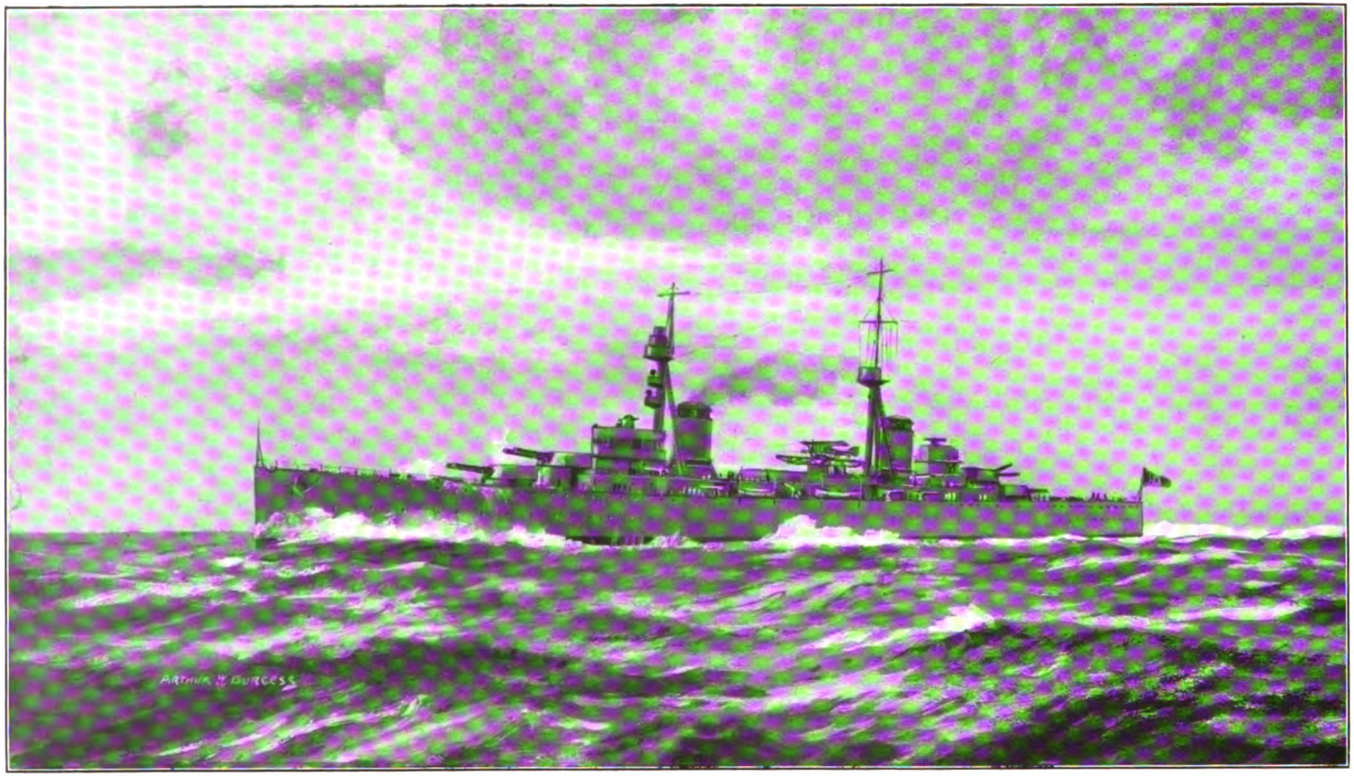
In addition to these vessels ten special vessels, and an unspecified number of auxiliaries are to be ranked as part of the permanent French fleet. The age of replacement was laid down as being 20 years for ships of the line and aircraft-carriers ; 17 years for light cruisers ; 15 years for flotilla leaders and destroyers ; 12 years for submarines. The remaining articles of the bill provided in great detail for the stocks of ammunition and supplies, to be maintained in the arsenals and shore establishments. Article 10, however, laid down that the fleet should be reconstructed by successive instalments until it was constituted according to the first article of the bill. This provision opened the door to a further bill, to authorize the building which was immediately necessary.

M. Dumesnil made out his case for the bill with the greatest care. If the Chamber provided for no construction beyond that which was immediately in hand, the French fleet would be composed of only 6 light cruisers, 7 flotilla leaders, 39 destroyers, and 23 submarines in 1932. He added a table to show that, even if effect were given to his bill, the French fleet would, in certain items, have passed its maximum figures by the same date.

New Construction.

His proposal was, therefore, to lay down, between 1925 and 1929 : 4 cruisers, 15 flotilla leaders, 18 destroyers, 2 submarine cruisers, 28 first-class submarines, 6 minelaying submarines, 2 surface mine-layers, 4 oilers, 1 submarine parent ship, 1 aviation transport ship, and to distribute the construction over each successive year, so as to equalize the charges as much as possible. These proposals will give the French fleet : 10 light cruisers, 22 leaders, 58 destroyers, 2 submarine cruisers, 57 ocean-going and minelaying submarines by 1932. Although it will roughly put the Navy up to the complement laid down in the naval statute in the matter of submarines, one-third of the total requirements in light cruisers and destroyers will, even then, have to be provided for.

The coast defence submarines are not provided for in the naval statute, and will probably be laid down at the rate of three a year.



(*From a drawing by Arthur J. W. Burgess.*)

ITALIAN CRUISERS TRENTO AND TRIESTE.

When the two programmes are completed, France will possess a powerful submarine fleet of over a hundred units (58 ocean-going and 48 inshore boats).*

Owing to a Ministerial crisis this second bill was not discussed as a whole. M. Dumesnil left the Ministry of the Marine when M. Herriot's Government fell. He was succeeded by M. Emile Borel.

ITALY.

Admiral Thaon di Revel presented his report on the Navy and his Navy Estimates for 1924–1925 towards the end of the year. Neither contained anything of outstanding interest. The Estimates were increased by about £1,500,000 over those of the previous year, mainly because, Admiral Thaon di Revel explained, his department had undertaken a number of duties, which every other department refused to carry out. The base at Maddalena is to be abandoned, as it could be made untenable by artillery from the Corsican side. No work has yet been done upon the projected bases on the west coast of Sicily and Sardinia. The policy of scrapping old and obsolete units of the fleet has been rigorously proceeded with ; since January, 1924, 23 vessels (1 cruiser, 5 destroyers and torpedo boats, 11 monitors, and 6 auxiliary craft) have been taken off the list of the Navy. The Admiral admitted, however, that the building programme was not satisfactory, in that no work had yet been done upon the 10,000 ton cruisers or upon the four Balilla class submarines. "At the end of 1928," said the Minister, "our fleet will be at three-quarters its present efficiency ; and in 1932, at one-half, in spite of our new building. When I think of the strongest Mediterranean nation facing us, I have bitterly to admit, that eight years hence, our naval power will be one-third of hers." It is understood that a four-years' programme of cruisers, destroyers, and submarines is being proceeded with, of which four 10,000 ton cruisers, eight submarines, and eight destroyers are in progress of construction, as well as the vessels of an earlier programme, and that during 1926–27 a further cruiser, twelve destroyers, and twelve submarines will be laid down. It has also been stated that Italy will have about 2,000 seaplanes in service by the end of 1925.

The Naval Manœuvres.

The Italian manœuvres which were arranged to take place in August, 1925, were conceived on a plan quite different to any that the Italian naval staff has previously attempted. In all former fleet manœuvres, a battle between the two opposing sides had been the culminating point in the exercises. The manœuvres of last year were intended to test the Italian Navy's ability of keeping Italy's maritime communications in the eastern Mediterranean open against an adversary attacking them from the western basin. For the

* Further information with regard to the Japanese, French, and Italian programmes will be found in the chapter on "The By-products of the Washington Conference."

purpose of the new exercise, of which particulars were published in the *Revue Maritime*, Italian territory was assumed to run from Cape Pessaro, at the southern end of Sicily, along the east coast of the island, across the Straits of Messina and thence to the south-eastern corner of Italy itself. Taranto and Syracuse were thus the chief harbours in the Italian or " Blue " territory. The enemy, " Red," was assumed to be operating from Trapani, at the western end of Sicily. The two forces were divided as follows :—

" Red " or enemy squadron.	" Blue " or Italian squadron.
Battleships : Giulio Cesare, Dante.	Battleships : Doria (flag), Duilio.
Cruisers : Nino Bixio.	Flotilla leaders : Leone, Aquila, Riboty.
Destroyers : 2nd flotilla.	Destroyers : 1st flotilla.

The umpire, Admiral Alfredo Acton, flew his flag in the Cavour, and had the leader Falco under his orders.

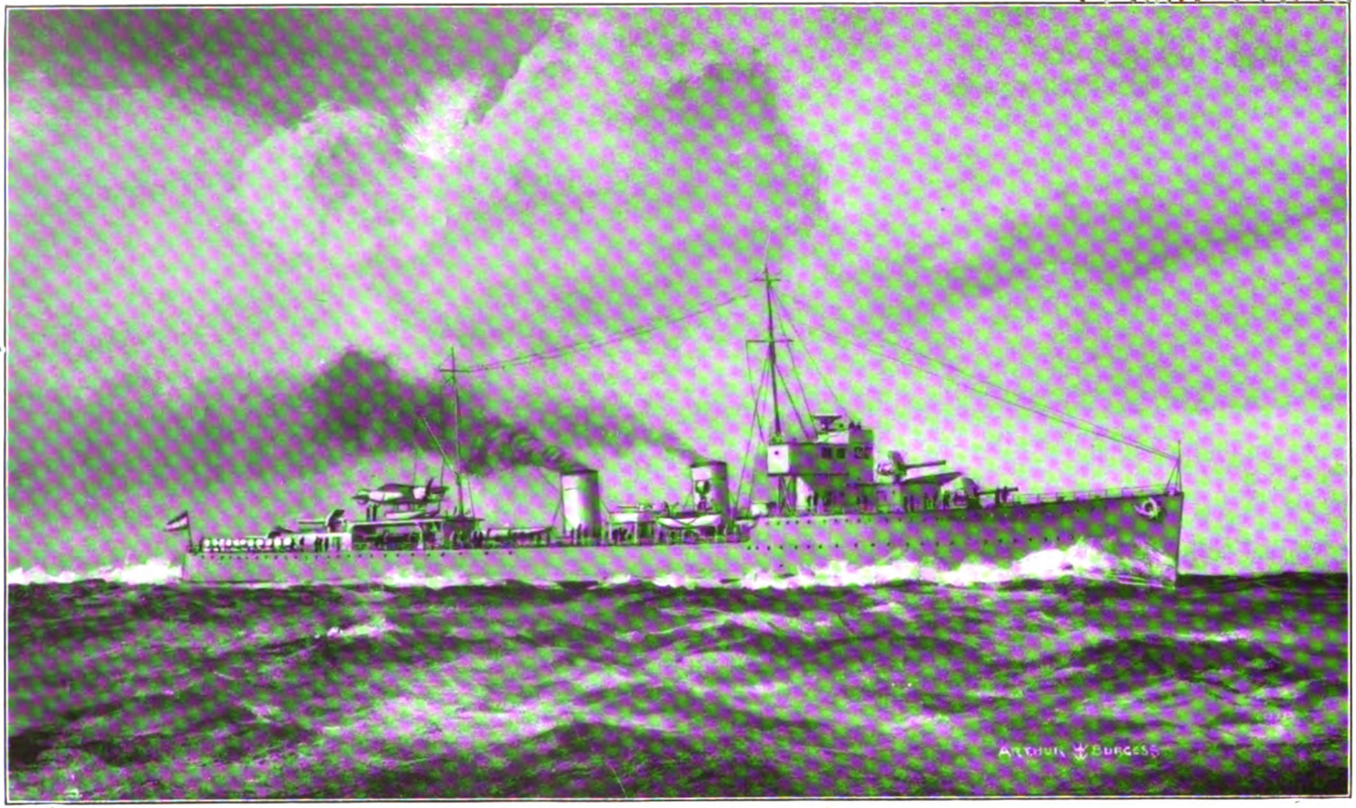
The object of the " Blue " squadron was to cover a convoy of ships assembled at Tobruck, on the coast of Cyrenaica, and to insure its safe arrival in some Italian harbour ; that of the " Red " squadron was to locate and disperse it. The commander of the " Blue " squadron was given six days in which to carry out his orders ; when the manœuvres began, the convoy was covered by the Riboty and four destroyers of the first flotilla, which were supposed to have escorted it into harbour from the eastern part of the Mediterranean.

Admiral Corz, of the " Red " squadron, made his plans on the assumption that the enemy would attempt to oppose him if he went direct through the Malta channel, and that the convoy would make for one of the Sicilian ports. He therefore moved to a point north-west of Benghazi, with the bulk of his forces, placed one group of light craft to watch the Malta channel, and sent the Nino Bixio to co-operate with a force of submarines which appear to have been cruising between the south-west corner of Morea and the western end of Crete. Further forces of submarines were stationed off the principal harbours of the " Blue " territory.

Admiral Lovatelli's plan was, however, not what Admiral Corz had supposed. He placed submarines in the Malta channel to attack and delay Admiral Corz's fleet if it passed through, and then steered with all his forces to a pre-arranged sea rendezvous with the convoy, which with its escort were given orders to make for Cotrone on the southern side of Apulia, on a course which, naturally enough, took it well clear of Admiral Corz's point of concentration off Benghazi. The leader Aquila, which was ordered to leave Augusta and join up with the convoy, was to see to it that the waters to the west of the convoy's track were clear of " Red " forces.

Course of the Operations.

All forces put to sea during the night of August 21, and at eight o'clock on the following morning Admiral Lovatelli met the convoy and its escort ; at about the same time the Aquila joined up, having seen nothing of the opposing forces during its passage from Augusta. The united forces then steamed towards Cotrone. The convoy had,



(*From a drawing by* **Arthur J. W. Burgess.**)

NETHERLAND TORPEDO BOAT DESTROYER.

(*Being built in Holland from the design of Yarrow & Co.* (1921), ***Ltd.***, *Scotstoun, Glasgow.*)

however, been located during the night of the 21st by the submarine Barnerigo, working off the coast of Morea, and Admiral Corz was warned by the Nino Bixio, which, as has been shown, was working with this eastern group of submarines. Admiral Corz received the news during the forenoon of the 22nd, and, assuming that the convoy was making for Taranto, steered due north to cut it off. At the same time Admiral Lovatelli was forced to alter his plans. An aeroplane reconnaissance located the Bixio to the north of him, and rather than fall in with a light cruiser which would be certain to shadow him, he turned to the westward, and steered towards Augusta with his whole force.

The position was now very uncertain, for Admiral Corz's forces were steering right across the track of the "Blue" squadron; during the night of the 22nd they actually passed one another quite close, and neither was aware of the other's presence. The "Red" forces held on towards Zante, where they took in oil; and during the operation, the Dante was torpedoed by a submarine. They got away soon afterwards, and spread over a line of search towards Taranto. No further news was received of the convoy or its escort, which arrived at Augusta on the morning of the 24th; as it was approaching the land, the Doria was torpedoed by one of the "Red" submarines off the approaches to the port. The safe arrival of the convoy, and the failure of the "Red" forces to disturb the communications between Italy and her African colony, was looked upon by the Press as a victory for the national forces.

OTHER FOREIGN NAVIES.

(*Arranged alphabetically.*)

Argentina.

The Navy of the Argentine Republic maintains its efficiency, and when the Prince of Wales arrived at Buenos Aires on August 17, 1925, he was received by some half-dozen vessels in the roads, aeroplanes circled overhead, and a company from the Naval School, with Colours and band, formed a Guard of Honour at the quay. The battleship Rivadavia has been delegated for a thorough overhaul, and to be fitted to burn oil fuel only, at Boston. She is one of two launched in 1911 from United States yards. The other, the Moreno, when passing the position of the Battle of Coronel, on November 28, 1924, paraded her crew and rendered homage to the British sailors who died for their country. For this act of comradeship and courtesy a message of thanks was sent from H.M. Government. In September, 1925, the training ship Presidente Sarmiento visited Birkenhead, where she was built in 1898.

Brazil.

A committee of the Chamber of Deputies has reported favourably on a recommendation that Brazil should acquire a cruiser of 10,000 tons, five destroyers, five submarines, and some auxiliary craft, for

replacement purposes. A Naval War College has been organized on similar lines to that of the United States Naval War College at Newport, R.I.

Chile.

Admiral Carlos A. Ward arrived in England in the summer of 1925 to take up duty as Head of the Chilean Naval Mission. In common with other Powers, Chile has scrapped certain of her older fleet units, including the protected cruiser Presidente Errazuriz, which was launched at La Seyne in 1890, and for several years had been employed for the sea-going instruction of cadets and in gunnery training.

Finland.

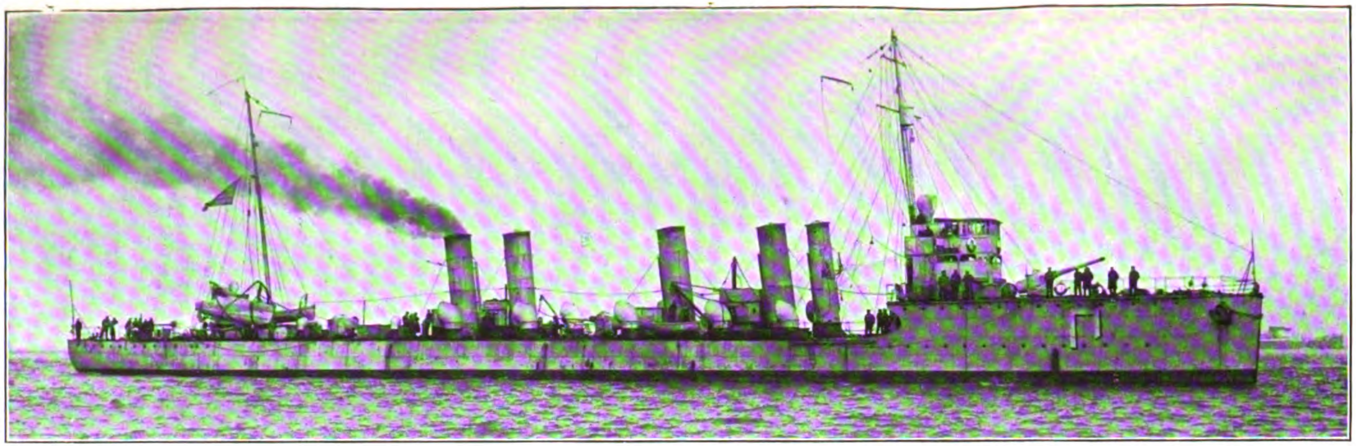
Russian interest in naval affairs, though embryonic, has had its effect upon other Baltic states; and Finland has led the way. A volunteer fleet of privately owned motor boats, to which some 100 owners have adhered, has been formed, under official patronage, and with official assistance. They have been formed into divisions of six boats each and have been provided with mechanics, signalmen, and machine guns. Owing to the goodwill displayed by all classes of society the Finnish Republic now possesses a mosquito fleet, whose numbers and efficiency are likely to increase as each year goes by. At the invitation of the League of Nations, the new Baltic States have stated what their naval policies in the future are likely to be. All have made practically the same answer: that small States must provide themselves with an adequate system of fixed and mobile coast defences, and that their naval budgets are intended solely for that purpose.

Germany.

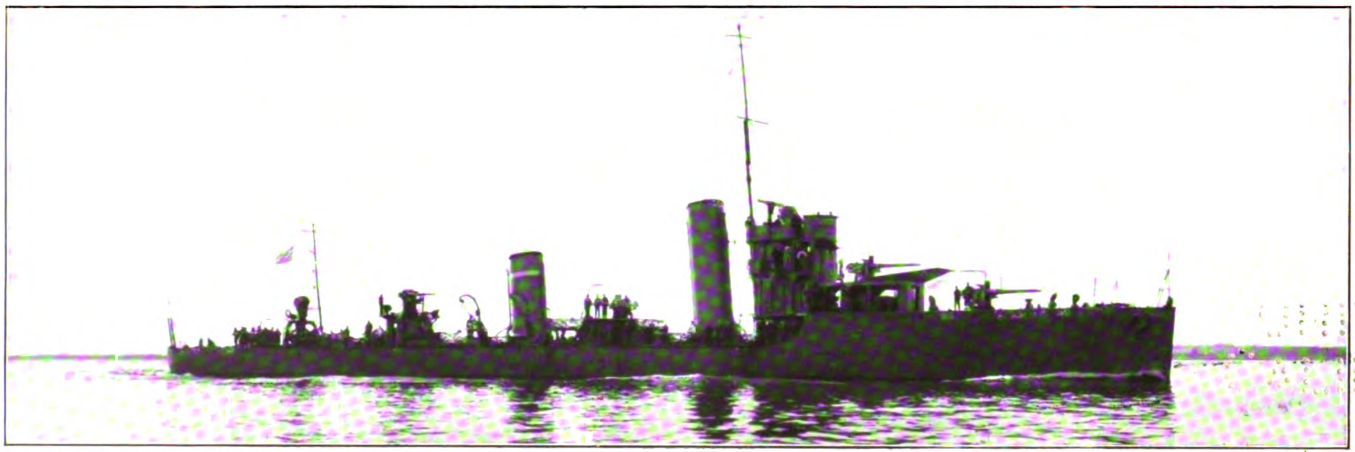
The reduced German Fleet has, it would seem, lost nothing of its old discipline and efficiency; practically the entire German Fleet in commission carried out manœuvres off Swinemunde between September 4 and 11. Admiral Mommsen is now the commander-in-chief of the German naval forces. The year has been quite an uneventful one for the German Navy, which has spent it in a strenuous routine of drills and exercises.

Greece.

In the winter of 1924–25, Vice-Admiral Sir Richard Webb carried out, by invitation, a thorough inspection of the vessels and establishments of the Greek Navy, and made a report thereon to the Athens Government. He was reported to have expressed a very favourable opinion of the intelligence, capacity, and seamanlike qualities of the Greek seamen, and to have remarked that several Greek officers, including the President's son, had studied on board British ships or in British training establishments. Following Sir Richard's inspection, it was announced on April 15, 1925, that the Admiralty had agreed to loan a permanent Naval Mission to Greece,



THE GREEK DESTROYER PANTHER BEFORE CONVERSION.



THE PANTHER AFTER CONVERSION BY J. SAMUEL WHITE & CO., LTD., COWES.

and Rear-Admiral Cyril S. Townsend, C.B., was appointed in charge. His staff included Commander F. Q. Champness, Lieut.-Commanders E. E. C. Tufnell and A. G. Talbot, *p.s.c.*, and Paymaster Lieut.-Commander H. P. Hunter, D.S.C.

The Greek destroyers Aetos, Jerax, Leon, and Panther, launched in 1911, were sent early in 1924 to the East Cowes works of Messrs. J. Samuel White & Co., Ltd., where they have been completely overhauled. The alterations comprise the removal of the whole of the boilers and main and auxiliary propelling machinery, the replacement of the five original watertube boilers by four larger watertube boilers designed to burn oil fuel on the White low-pressure system, the fitting of new boiler-room auxiliaries, and the rearrangement of the boiler uptakes to discharge into two large funnels of "flat oval" section instead of into five single funnels as formerly. The armament has been modernized and an anti-aircraft weapon added, of 3-inch calibre. In place of the four 18-inch torpedo tubes arranged on either side, two sets of triple 21-inch weapons, mounted on the centre line, have been substituted. The new guns and torpedo tubes have been supplied by Messrs. Vickers, Ltd., as well as fire control gear. Two Thornycroft depth charge throwers have been placed aft, and there are also two depth charge dropping chutes at the stern. In the Aetos and Panther, portable minelaying rails have been fitted. On their speed trials after reconstruction, the rates on the measured mile, and for eight hours' continuous steaming, were 31·10 and 30·1 knots for the Aetos, 32·03 and 31·1 knots for the Jerax, 32·50 and 31·16 knots for the Leon, and 31·61 and 30·6 knots for the Panther. The result of the work done has been to convert these vessels into a very efficient and up-to-date destroyer division.

Netherlands.

Two additional torpedo-boat destroyers were ordered by the Netherlands Government in May, 1925, to be built in Holland to the designs and under the supervision of Messrs. Yarrow & Co. (1921), Ltd., of Scotstoun, Glasgow, similar to two other vessels ordered in 1924. All four will have the latest type of Yarrow boiler. Another detail of these vessels to which attention might be drawn is the conning towers with communication tubes. In the face of international competition and after exhaustive tests the material submitted by Messrs. Hadfield, Ltd., Sheffield, proved superior to others, and this firm secured the contract to supply this portion of the vessels' structure. The toughness and non-splintering properties of this material are indicated by the illustration opposite, which shows the sample plate after the conclusion of the gunnery trial.

Poland.

The Military Commission of the Polish Diet has proposed, in order to carry out the coast defence policy of the minor Baltic Powers, the construction of 3 cruisers, 6 destroyers, 12 torpedo-boats, 12 submarines, and 36 auxiliary craft, within a period of twelve years.

Russia.

A German mission, headed by Engineer Mayen, recently examined the whole of the Russian Fleet and reported upon it. The German experts disagreed with the Russians as to the state of certain vessels, notably the Gaugut, but from the report, it appears that the battleships Marat and Paris Commune were practically the only ships in the Baltic capable of sea service. Later reports confirmed the scepticism of Engineer Mayen and his staff. During July, two battleships, a few cruisers, ten destroyers, and a few submarines, put to sea in the Gulf of Finland, but the vessels were so ill-manned and commanded, that the "manœuvres," for so they were called, caused an outcrop of accidents. Torpedo-boat 216 struck a mine and sank; on two occasions destroyers collided; the submarine Tur struck the bottom; a 6-inch gun burst in the Marat and caused loss of life. Great precautions had, moreover, to be taken to prevent this long casualty list from being even longer; at tactical exercises the ships could only manœuvre without colliding if the distances between them were very much increased.

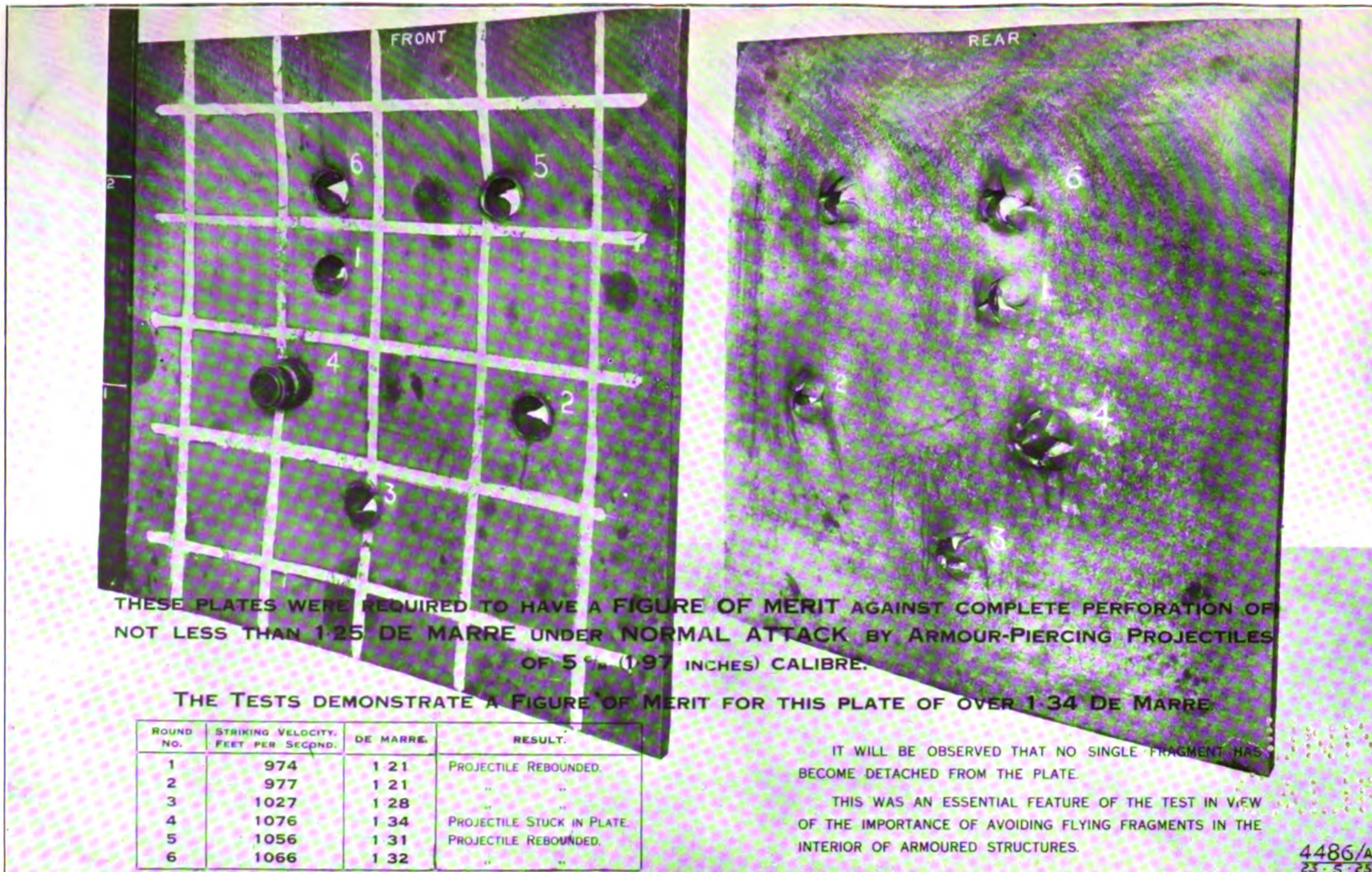
Some time after these manœuvres the Soviet Government made its first serious effort to take its naval affairs in hand. Admiral Pantserjansky made an exhaustive inspection of the fleet, and the Government announced that repairs and improvements on all older vessels would shortly be taken in hand, and that two cruisers of the 3,000 ton class and four destroyers of the 1,400 ton class would be built at Putilov yard and completed in 1931.

A plan for recruiting officers from a body known as the Communist Union of Youth has been worked out in some detail; and all the new officers are now passed through a Naval College at Leningrad. During the year the interned vessels of the Russian Black Sea Fleet have lain at Bizerta under French guardianship. Some time after the French Government recognized the Union of the Soviets, a Russian mission visited Bizerta to inspect the ships. Nothing more has been heard of the proposal that they should be returned to Russia; their condition is such that they would have to be towed, and they are hardly worth the expense of doing so.

Spain.

The Spanish building programme has made steady progress during the year. In February, the new cruiser Don Blas Lezo completed her trials and the work done in connection with the building law of 1915 now stands as follows:—

	Authorized.	Completed.	Building.	Still to be laid down.
Cruisers	4	2	2	nil
Destroyers	6	2	4	nil
Submarines	28	8	6	14
Gunboats	3	nil	nil	nil



Round No.	Striking Velocity. Feet per Second.	De Marre.	Result.
1	974	1·21	Projectile Rebounded.
2	977	1·21	" "
3	1027	1·28	" "
4	1076	1·34	Projectile Stuck in Plate.
5	1056	1·31	Projectile Rebounded.
6	1066	1·32	" "

RESULTS OF TESTS CARRIED OUT FOR THE DUTCH NAVAL AUTHORITIES ON HADFIELD'S SPECIAL "RESISTA 61" PLATE, ONE INCH IN THICKNESS.

Sweden.

Sweden's state of naval defence has been made public by the report of Admiral Riben upon the condition of the Navy. All his proposals are for increasing its efficiency as a coast defence organization. Torpedo destroyers and submarines in larger numbers will shortly be required, for at present Parliament has only authorized the building of two destroyers and two submarines. Above all, the Admiral has emphasized the need of intensive experiment in anti-submarine work. The strength of the naval flying service will, he has urged, have to be very much increased.

Two 55-feet coastal motor-boats of 37 knots guaranteed speed were ordered for the Swedish Navy from Messrs. Thornycroft & Co., Ltd., and the first was launched at Hampton-on-Thames on June 5, 1925, by Mrs. de Bahr, wife of the Swedish Naval Attaché. The armament includes two 18-inch torpedoes, two pairs of machine guns, and depth charges and smoke floats.

Turkey.

An order was placed in May, 1925, with the Fijenoord Company, of Rotterdam, for two submarines for the Turkish Government. The firm has built several under-water craft for the Dutch Navy at home and in the East Indies. A floating dock of 26,000 tons was also ordered from the Flender Brückenbau Company, of Lübeck.

Chas. N. Robinson.

CHAPTER III.

Comparative Naval Strength.

The Washington Naval Treaty stabilized the strength of the battle fleets of the five leading Naval Powers which took part in the Conference of 1921, and other maritime countries, owing mainly to financial considerations, have shown no inclination to lay down new capital ships. Except for the British battleships Nelson and Rodney, building in accordance with the terms of the Washington Treaty, no ships of this primary class have been begun by any Power; but it has been reported that the Navy Department of the United States is preparing plans for the two vessels which may be laid down in 1931, when capital ship construction will be resumed with a view to the replacement of obsolete units. In the same year, two vessels may be put in hand for the British Empire and one for Japan, while France and Italy will be at liberty each to lay down 35,000 tons of capital ship replacement tonnage in 1927, 1929, and 1931. It is provided that none of these vessels may exceed 35,000 tons or carry a heavier gun than the 16-inch weapon, but otherwise their designers will enjoy complete liberty of action. The problems which will confront them receive further consideration in this issue of "Brassey's Annual" from Sir George Thurston. It would evidently be an error to assume that all the vessels which can be laid down by the various Powers in 1931 and succeeding years will necessarily embody the same offensive and defensive features, and it should be noted that in the case of France and Italy the Treaty reserves to them the right of employing the capital ship replacement tonnage as they may consider advisable. As an example, in 1927 and succeeding years, when 35,000 tons is allowed to be put in hand by these two countries, two vessels of 17,500 tons each could be laid down if desired.

Cruiser Replacement.

While there is a complete absence of present activity in the construction of capital ships, progress is being made in building cruisers, as the accompanying table indicates. Apart from the Emerald and Enterprise, which were laid down towards the close of the war, nine cruisers, including the two ordered by the Australian Govern-

ment, are building in British shipyards, and two more will be laid down in February of this year (1926), all of them being, as the Admiralty has announced, of 10,000 tons displacement, which is the maximum fixed in the Washington Treaty. In the United States eight vessels of the same size have been authorised and the finance provided for two of them, while the Japanese naval authorities, in addition to the Naka, of 5,570 tons, four vessels of 7,100 tons, and two of 10,000 tons, which are building, have received authority to begin two more cruisers of what may be described as the Washington type; Italy, with the two 10,000 ton cruisers building, has two authorised and four more projected, while France is constructing two cruisers of the largest type and has four more projected. Though the tendency is for all the principal Naval Powers to take full advantage of the Washington Treaty in the matter of displacement and armament, the British Admiralty has announced that it proposes this year to begin, under the new programme, the first of seven ships of smaller size—8,000 tons.

There is no indication, in spite of this activity in cruiser construction, that any Naval Power is embarking upon more than a replacement programme. But, whereas the British, American, French, and Italian proposals will only partially make good the losses due to obsolescence, the Japanese naval authorities are apparently replacing ship for ship. The result must be that the Japanese cruiser strength in future years will be considerably increased in proportion to the strength of other Powers, as the following table (which does not include ships authorised) suggests :—

	1914.			1925.		
	Built.	Building.	Total.	Built.	Building.	Total.
British Empire . .	110	18	128	47	11	58
United States . .	41	—	41	32	—	32
Japan	34	—	34	31	6	37
France	34	—	34	14	2	16
Italy.	26	3	29	13	2	15

This statement reflects broadly the cruiser policy which is being pursued by the various Powers. The British Empire is making no attempt to maintain its pre-war strength in cruisers; it is, on the contrary, only replacing some of the vessels now in commission or reserve which will be removed from the effective list in the course of the next few years. In less marked degree, the United States, which has laid down only ten cruisers since the end of 1905, is exhibiting a policy of moderation in view of the large number of existing cruisers in the American Fleet which must shortly be withdrawn from service. France and Italy are also pursuing a modest policy in their shipbuilding proposals. Japan, on the other hand, is, at least, fully maintaining her strength in cruisers which she possessed in 1914, after full allowance has been made for the scrapping of older ships, since she has laid the keels of twenty-six since the close of 1905.

It will be observed that all the Powers, except Great Britain, possess a larger number of flotilla leaders and destroyers built and building, authorised or projected, than was recorded in the last issue of the "Annual," and progress continues to be made in building up bigger flotillas of submarines. The aggregate numbers, including vessels built, building, and authorized, are now as follows :—

	Flotilla Leaders and Destroyers.			Submarines.		
	Built.	Building and authorized.	Total.	Built.	Building and authorized.	Total.
British Empire	207*	2	209	63	6	69
United States	299	12	311	121	12	133
Japan	109	15	124	51	28	79
France	73	39	112	53	16	69
Italy	63	24	87	43	12	55

Naval Forces in the Pacific.

The inevitable conclusion to be drawn from these figures is that all the Naval Powers, except Great Britain, are pressing forward the construction of flotilla leaders, destroyers, and submarines with energy, with the result that in future years their flotillas will be greatly increased in strength. It is in these circumstances that the British Admiralty's building programme includes nine destroyers in each of the years 1927–1929, and that in the approaching year the first six of four annual programmes of six submarines—twenty-four in all—will be taken in hand.

When the present programmes have been completed, the British Fleet will possess six aircraft carriers and two aircraft tenders, while the United States and Japan will have three carriers and one tender, and France and Italy one carrier each. Germany also has a smaller ship of this class.

The manœuvres of the American and Japanese fleets, and the visits to Australian and New Zealand ports of a powerful American force, have directed attention to the naval problems of the Pacific Ocean. The centre of naval interest has now definitely shifted from the North Sea and the Atlantic to these waters. In accordance with this change in the situation, the main British Fleet has been moved from home waters, and the Mediterranean force is once more the largest and most powerful force in commission under the British ensign. On the other hand, as the accompanying statement reveals, the British strength in the Pacific is comparatively weak in relation to the squadrons maintained in those waters by the United States and Japan. As a matter of interest the disposition of British naval forces in January, 1904, on the eve of the redistribution which was carried out in view of the growing menace of the German fleet, is shown on page 13.

* Eighteen of these vessels are now on the sale list.

NAVAL FORCES IN THE PACIFIC.

	British.	United States.	Japanese.
Battleships	—	California West Virginia Pennsylvania Oklahoma Nevada Arizona New Mexico Mississippi Idaho Colorada Maryland Tennessee	Matsu Hyuga Yamashiro Fuso Yagato
Battle-cruisers	—	—	Kongo Hiyei Kirishima
Cruisers	Hawkins Vindictive Carlisle Diomede Despatch Durban Dunedin Philomel Adelaide Brisbane Melbourne Pioneer Sydney	Huron Seattle Omaha	Ohi Kinu Abukuma Tenryu Natori Nagara Yura Sendai Isudzu Tone Yahagi Tatsuta
Destroyers	11	60	51 (and 27 in reserve)
Submarines	12	42	43 (and 12 in reserve)
Aircraft	—	—	1
Gunboats	16	8	—
Sloops	9	—	—
Minesweepers	1	8	16
Minelayers	—	—	1

TABLE I.—EFFECTIVE FIGHTING SHIPS, BUILT AND BUILDING.

Class.	British Empire.			U.S.A.			Japan.			France.			Italy.			Russia.			Germany.		
	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.
Battleships, 14-in. guns and upwards	10	2	12	14	—	14	6	—	6	—	—	—	—	—	—	—	—	—	—	—	—
Battle-cruisers, 14-in. guns and upwards	3	—	3	—	—	—	4	—	4	—	—	—	—	—	—	—	—	—	—	—	—
Battleships, smaller guns	8	—	8	4	—	4	—	—	—	9	—	9	7	—	7	3	1	4§	8	—	8
Battle-cruisers, smaller guns	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Aircraft carriers and aircraft tenders	6	2	8	2	2	4	2	2	4	—	1	1	—	1	1	1	—	1	—	—	—
Cruisers	50	11	61	32	8†	40	31	{6, 2†}	39	14	{2, 4†}	20	13	{2, 2†, 4*}	21	7	4‡	11§	8	1	9
Flotilla Leaders and Destroyers	207‖	2	209	299	12†	311	109	15†	124	73	{6, 33†}	112	63	{16, 8†}	87	77	25	102§	16	1	17
Submarines	63	6	69	121	{6, 6†}	133	51	{12, 16†}	79	53	{16, 36*}	105	43	{12, 8*}	63	27	—	27§	—	—	—

* Projected.
† Authorized.
‡ May be broken up for scrap.
§ It is very improbable that the vessels building will be completed. The military value of many of these vessels is small.
‖ Eighteen of these vessels are now on the sale list.

TABLE II.—BATTLESHIPS WITH 14-IN. GUNS AND UPWARDS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			RUSSIA.			GERMANY.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.			tons.			tons.												
—	*Nelson*	35,000	1921	Colorado	32,600	1920	Mutsu ...	33,800												
—	*Rodney*		1921	West Virginia		1919	Nagato ...													
1915	Malaya	27,500	1920	Maryland ...	32,300	1917	Hyuga ...	31,260												
1914	Valiant		1919	Tennessee ...		1916	Ise													
1914	Barham		1919	California ...		1915	Yamashiro	30,600												
1913	Queen Elizabeth		1917	Idaho	32,000	1914	Fuso													
1913	Warspite		1917	New Mexico																
1915	Royal Sovereign	25,750	1917	Mississippi ...																
1914	Royal Oak ...		1915	Arizona	31,400															
1915	Revenge ...		1915	Pennsylvania																
1916	Resolution ...		1914	Oklahama ...	27,500															
1916	Ramillies ...		1914	Nevada																
			1912	Texas	27,000															
			1912	New York ...																
	12 ships.	336,250		14 ships.	430,200		6 ships.	191,320												

TABLE III.—BATTLE-CRUISERS WITH 14-IN. GUNS AND UPWARDS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			RUSSIA.			GERMANY.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.						tons.												
1918	Hood...	41,200				1913	Kirishima	27,500												
1916	Renown	26,500				1913	Haruna													
1916	Repulse					1912	Hiyei ...													
						1912	Kongo ...													
	3 ships.	94,200					4 ships	110,000												

NOTE.—Vessels of which the names are printed in italics are under construction.

TABLE IV.—BATTLESHIPS WITH SMALLER GUNS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			RUSSIA.			GERMANY.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.			tons.			tons.			tons.			tons.			tons.			tons.
1913	Benbow		1911	Arkansas	26,000				1913	Bretagne		1913	Andrea Doria	22,562	1911	Pariskaia Kommuna	23,000	1905	Hannover...	
1913	Emperor of India	25,000	1911	Wyoming					1913	Lorraine...	23,177	1913	Caio Duilio ...		1911	Marat ...		1906	Schleswig-Holstein	13,200
1912	Marlborough ...		1910	Florida ...	21,825				1913	Provence		1911	Conte di Cavour	22,023	1911	Poltava ...		1906	Schlesien ...	
1912	Iron Duke		1909	Utah ...					1911	Courbet ...		1911	Giulio Cesare					1902	Braunschweig	
1912	Ajax								1911	Jean Bart	23,095	1910	Dante Alighieri	19,190				1903	Preussen ...	13,000
1911	Centurion	23,000							1912	Paris ...		1907	Roma	12,655				1903	Hessen ...	
1911	King George V.								1909	Diderot ...	18,560	1905	Napoli					1903	Elsass	
1911	Thunderer ...	22,500							1909	Condorcet	18,600							1904	Lothringen	
									1909	Voltaire...	18,500									
	8 ships.	191,500		4 ships.	95,650					9 ships.	194,476		7 ships.	133,670		3 ships.	69,000		8 ships.	104,600

TABLE V.—BATTLE-CRUISERS WITH SMALLER GUNS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			RUSSIA.			GERMANY.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.																		
1913	Tiger	28,500																		
	1 ship.	28,500																		

Table VI.—Aircraft Carriers and Aircraft Tenders.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			RUSSIA.			GERMANY.		
Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.	Launched.	Name.	Displace-ment.
		tons.			tons.			tons.			tons.			tons.			tons.			
1916	Furious ...	19,100	Con-verted 1921	Langley ... ... (formerly collier Jupiter)	19,360	1921	Hosho ...	9,500	1920	*Béarn* ...	21,400	1923	Miraglia	5,000		Orlitza ...	3000			
1917	Argus ...	14,450				—	Waka-miya	5,870												
1917	Pegasus	3,070																		
1914	Ark Royal	7,080	Do.	Wright	11,000	1925	*Akagi* *	33,000												
1919	Hermes ...	10,950		*Lexington* *	} 33,000		*Kaga* †	27,000												
1918	Eagle ...	22,790		*Saratoga* *																
1916	*Courageous*	18,600																		
1916	*Glorious*	18,600																		
	8 ships.	114,640		4 ships.	96,360		4 ships.	75,370		1 ship.	21,400		1 ship.	5,000		1 ship.	3,000		Nil	—

* Designed as battle-cruisers; being converted to aircraft carriers under the Washington Treaty.
† Designed as a battleship

Note.—Vessels of which the names are printed in italics are under construction.

N.B.—An aircraft-carrier is defined by the Washington Treaty as: A vessel of war with a displacement in excess of 10,000 tons *standard displacement* designed for the specific and exclusive purpose of carrying aircraft. It must be so constructed that aircraft can be *launched therefrom and landed thereon*. Limitations for armament are also laid down.

TABLE VII.—CRUISERS (*continued on next page*).

BRITISH EMPIRE.

Speed.	Name.	Displacement.
kts.		tons.
	2 authorised ...	10,000
	2 building ...	10,000
	Berwick	
	Cornwall ...	
	Kent	10,000
	Suffolk	
	Cumberland ...	
	Kent Class (A) (2 vessels)	10,000
33	*Emerald* ...	7,550
33	*Enterprise* ...	
30	Effingham ...	
30	Frobisher ...	9,750
30	Hawkins ...	
29	Despatch ...	4,765
29	Diomede (N.Z.)	
29	Durban	
29	Delhi	
29	Dunedin (N.Z.)	4,650
29	Danae	
29	Dauntless ...	
29	Dragon	
29	Capetown ...	
29	Cairo	
29	Calcutta	
29	Carlisle	
29	Colombo	4,190
29	Cardiff	
29	Coventry ...	
29	Curlew	
29	Ceres	
29	Curacoa	
29	Caledon	4,120

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
35	Omaha ...	
35	Milwaukee	
35	Cincinnati ...	
35	Raleigh ...	
35	Detroit ...	7,500
35	Richmond ...	
35	Concord ...	
35	Trenton ...	
35	Marblehead	
35	Memphis ...	
24	Chester ...	
24	Birmingham	3,750
24	Salem	
21	Olympia ...	6,000
20	Albany ...	3 430
20	New Orleans	3,430
16½	Galveston ...	
16½	Chattanooga	
16½	Denver ...	3,200
16½	Des Moines	
16½	Cleveland ...	
21	Rochester ...	8,150
22	Charlotte	
22	Missoula	14,500
22	Seattle	
22	St. Louis	9,700
22	Charleston	
22	Huron	
22	Frederick	
22	Pittsburg	13,680
22	Pueblo	
22	Huntington	

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
33	*Naka*	
33	Sendai ...	
33	Jindzu ...	
33	Nagara ...	
33	Kinu	5,570
33	Abukuma ...	
33	Natori ...	
33	Isudzu ...	
33	Yura	
33	Kuma... ...	
33	Tama	
33	Kitakami ...	5,500
33	Kiso	
33	Ob-I	
33	Yubari ...	3,100
33	Tenryu ...	3,500
33	Tatsuta ...	
26	Yahagi ...	
26	Hirado ..	4,950
26	Chikuma ...	
23	Tone	4,100
20	Nisshin ...	7,628
20	Kasuga ...	
20¾	Iwate	9,750
20¼	Idzumo ...	
20½	Yakumo ...	9.646
20	Adzuma ...	9,307
21¼	Asama ...	9,700
20	Tsushima ...	3 420
22½	Chitose ...	4,992
19½	Akashi ...	2,800

FRANCE.

Speed.	Name.	Displacement.
kts.		tons.
27¼	Metz ... ... (*ex* Konigsberg)	5,300
28¼	Mulhouse ... ... (*ex* Stralsund)	4,480
27	Strasbourg ... (*ex* Regensburg)	4,900
27	Thionville ... ... (*ex* Novara)	3,500
26¼	Colmar ... ... (*ex* Kolberg)	4,280
23	Waldeck Rousseau	13,828
23	Edgar Quinet ...	
23	Ernest Renan ...	13,500
23	Jules Michelet...	13,100
22	Victor Hugo ...	13,108
22	Jules Ferry ...	12,351
34	Duguay-Trouin	
34	La Motte Picquet	8,000
34	Primauguet ...	
34	*Tourville*	10,000
34	*Duquesne*	
	Four projected ...	10,000

ITALY.

Speed.	Name.	Displacement.
kts.		tons.
28¼	Taranto ... ... (*ex* Strassburg)	4,480
28	Marsala	3,600
28	Nino Bixio ...	
28	Quarto	3,220
27¼	Ancona ... ... (*ex* Graudenz)	4,842
27¼	Bari ... ... (*ex* Pillau)	4,320
27	Brindisi ... ... (*ex* Helgoland)	3,440
27	Venezia ... ... (*ex* Saida)	
22	Libia...	4,000
17	Campania ...	2,444
22¼	San Giorgio ...	10,800
23	San Marco ...	10,000
23	Pisa	10,600
35	*Trento* ...	10,000
35	*Trieste* ...	
	Two authorised	10,000
	Four projected	10,000

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
29¼	Svietlana ...	6,800
29½	Chevonaya-ukrainia...	7,600
23	General Kornilov	1,675
23	Komintern	
29½	*Lazarev* ...	7,600
21	Rurik	15,190
19	Almaz ...	3,300
20	Aurora ...	6,730
	Admirals-Butakov ...	
	Grieg ...	6,800
	Spiraidov	

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
22	Berlin ..	3,250
22	Hamburg ...	
21	Arkona ...	2,700
21	Medusa ..	
21	Amazone ...	
21	Thetis... ...	2,650
21	Nymphe ...	
21	Niobe	
27½	Emden ...	5,600

TABLE VII.—CRUISERS (*continued*).

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			RUSSIA.			GERMANY.		
Speed.	Name.	Displace-ment.	Speed.	Name.	Displace-ment.	Speed.	Name.	Displace-ment.	Speed.	Name.	Displace-ment.	Speed.	Name.	Displace-ment.	Speed.	Name.	Displace-ment.	Speed.	Name.	Displace-ment.
kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.
29	Calypso	4,120		*Eight autho-*			*Kako*													
29	Caradoc			*rised* ...	10,000		*Furutaka* ...	7,100												
29	Concord						*Kinugasa* ...													
29	Centaur						*Aoba*													
29	Cambrian ...	3,750					*Nachi*	10,000												
29	Canterbury ..						*Myoko*... ...													
29	Constance ...						Ashigara ...	10,000												
29	Castor						Haguro ...													
29	Champion ...																			
29	Calliope																			
29	Comus	3,750																		
29	Conquest ...																			
29	Carysfort ..																			
29	Cleopatra ...																			
29	Aurora (c) ...	3,500																		
28¾	Vindictive ...	9,750																		
25½	Birmingham...	5,440																		
25½	Lowestoft ...																			
25½	Adelaide (A)...	5,550																		
25½	Yarmouth ...																			
25½	Dartmouth ...	5,250																		
25½	Weymouth ...																			
25½	Brisbane (A)...																			
25½	Sydney (A) ...	5,400																		
25½	Melbourne (A)																			
	60 ships. †	352,670		40 ships.	334,560		39 ships.	249,701		20 ships.	194,175		21 ships.	144,786	‡	11 ships.	80,970		9 ships.	28,050

(A) Australian Navy. (C) Canadian Navy. (N.Z.) New Zealand Government.

† See table of cruising ships, p. 370, for condition of these vessels.

NOTE.—Vessels of which the names are printed in italics are under construction.

CHAPTER IV.

Naval Policy of the Empire—The Need for Co-operation.

Before examining the question of Imperial Naval Policy, it is as well to recall to mind the object for which an Imperial Navy exists, and to indicate the reasons which make naval power so much more important to the British Empire than to any other country in the world.

This Empire of ours extends into all oceans, and connection between the different parts of it, so far as the carriage of people and goods is concerned, is maintained at present entirely by sea. Progress in aviation tends to provide in the future a second and more rapid means of transport for human beings, but so far there is nothing to indicate that the carriage of goods can be effected in any considerable quantity by aircraft.

This being the case, the trade of the Empire is absolutely dependent upon the free use of the seas for its economic development and prosperity. Without it, exports and imports must cease, and each portion of the Empire must be thrown back upon its own resources. Let us consider what would be the economic effect of such a situation.

Great Britain is dependent upon transit by sea for the following proportion of the food of the population :—

The whole of the tea, coffee, cocoa, sugar, and rice.
50 per cent. of the meat.
65 per cent. of the cheese and butter.
70 per cent. of the cereals.

Of the raw materials needed for manufactures the proportion imported by sea is as follows :—

The whole of the cotton, silk, copper, copper ore, hemp, raw jute, and nickel ore.
93 per cent. of the wool.
98 per cent. of the tin ore and zinc ore.
94 per cent. of the lead.
33 per cent. of the iron ore.
96 per cent. of the liquid fuels required mainly for bunkers, motor transport, and aircraft.

Transport by sea is also needed for the export of all its finished articles and its coal. If the use of the sea were denied to Great Britain we should be left (*a*) with a starving population, and (*b*) with most of our manufactories shut down owing to absence of material and lack of facilities for exporting the finished goods. The Dominions, which are practically self-supporting, so far as food is concerned,

(Photo by Stephen Cribb.)

H.M. LIGHT CRUISER VINDICTIVE.

(Built and engined by Harland & Wolff, Ltd., Belfast.)

would find no outlet for their surplus production, and their prosperity would vanish. The military aspect of the same situation would be, that any strong aggressive action taken against the British Empire could be undertaken piece-meal, each portion being attacked and conquered separately with no possibility of one portion being able to come to the assistance of any other. The above is, of course, the extreme case.

Functions of the Navy.

The purpose for which the British Navy is maintained is the protection of the sea communications of the Empire. It is not, therefore, an aggressive force, its existence being due to the necessity for defence, although in time of war it should at once assume and press a strong offensive for the reason given below.

The *Defensive* rôle of the Empire's naval forces is (1) to protect our sea-borne trade, and (2) to allow of free movement of our armed forces across the seas between the different parts of the Empire. The defensive rôle is placed first to emphasize the reason for the existence of our Navy.

The *Offensive* rôle comprises (1) the destruction or neutralization of the sea-borne trade of the enemy, and (2) the prevention of the use of the sea by the enemy for the transport of his armed forces.

To achieve these ends, *the quickest and surest course is to encompass the destruction or neutralization (if destruction cannot be effected) of the naval forces of the enemy, since such action affords the best defence.* Consequently the main body of the Empire's naval forces, including the capital ships and their attendant vessels, must be employed in that part of the world in which is situated the main fleet of the enemy.

It has been argued of late years that trade can be defended as efficiently and more economically from the air than by ships on the sea, and these arguments have led to increased opposition to the maintenance of adequate naval forces. However great may be the influence of aircraft on the technique of naval warfare in narrow waters such as the North Sea, English Channel, and Mediterranean Sea, it must be obvious to any one with knowledge of the limited radius of action of aircraft of the heavier-than-air type that they can only operate in open waters if working from an aircraft-carrier. Such a vessel is herself open to attack by surface vessels, and would be so attacked, thus preventing the defence of trade by her aircraft. So far as attack by aircraft on surface vessels raiding trade routes is concerned, it must be remembered that the weight of armament, be it machine guns or bombs, that aircraft can carry is limited; counter measures taken by ships will force aircraft to fly high, thus adding to their difficulties in hitting a moving ship by bombs, and I can see no reason to think that surface vessels engaged in attacks on trade in open waters can be successfully countered by aeroplanes.

Airships, as they develop and become reliable, may, by their larger radius of action, be more capable of operating at long distances from land, but an airship, although possibly of future great value

for reconnaissance work, is far more vulnerable than an aeroplane to anti-aircraft measures. Therefore it seems certain that we are, as an Empire, still as dependent on surface vessels for the defence of trade as we are for the transport of goods, and it is equally certain that we shall continue to be so dependent for many years to come. As an Empire, then, a general naval policy amongst the nations composing the Empire, having as its object the protection of sea communications, is a very real necessity, and it is desirable to examine the basis on which such a policy must necessarily be framed.

Basis of Naval Policy.

In the first place, it cannot be too often reiterated that in war-time the naval forces of the whole Empire must be considered as one, under one supreme command—the Admiralty. Any other line of action would inevitably lead to dissipation of forces and possible disaster. The necessity for unity of command on land was demonstrated during the late war, and accepted by the British and United States Armies. Unity of command at sea is even of yet greater importance. Admiral W. S. Sims, commanding the United States Naval Forces in European waters on the entry of the United States into the war, realizing this, at once placed his ships under British command.

The Empire's naval force in war in the future, as in the past, must comprise (1) the *main fleet*, whose function is the destruction or neutralization of the main fleet of the enemy. (2) Such *secondary* forces as are needed for subsidiary operations, possibly in conjunction with the other services. (3) The forces needed to insure the *security of our world-wide sea communications*. (4) The auxiliary forces needed for *local defence*, whether of harbours or of coastal traffic, particularly in the main theatre of war and adjacent waters.

A true Empire naval policy should therefore aim at the provision of the forces mentioned above, the cost being distributed between the different parts of the Empire in accordance with their ability to bear it. It is, of course, true that security of sea communications will appear to people in some parts of the Empire to be of greater importance than to people in other parts, either by reason of geographical conditions which affect the sea sense of the population, or because a larger percentage of the trade of any particular part of the Empire is sea borne and therefore needs sea protection.

Decisions of the Imperial Conference.

The 1923 Imperial Conference took note of these facts in its first and second resolutions, which read as follows :—

(1) The Conference affirms that it is necessary to provide for the adequate defence of the territories and trade of the several countries comprising the British Empire.

(2) In this connection the Conference expressly recognizes that it is for the Parliaments of the several parts of the Empire,

upon the recommendations of their respective Governments, to decide the nature and extent of any action which should be taken by them.

The third resolution mentioned the primary responsibility which lies upon each portion of the Empire, of providing for its own local defence in the following terms :—

(*a*) The primary responsibility of each portion of the Empire represented at the Conference for its own local defence.

This same third resolution proceeded to suggest the provision of ships for the protection of overseas communications and the provision of naval bases and fuel depôts in these words :

Adequate provision for safeguarding the maritime communications of the several parts of the Empire and the routes and waterways along and through which their armed forces and trade pass.

The provision of naval bases and facilities for repair and fuel so as to ensure the mobility of the fleets.

Whilst the maintenance of the one-Power standard was also emphasized as follows :—

The desirability of the maintenance of a minimum standard of naval strength, namely, equality with the naval strength of any foreign Power, in accordance with the provisions of the Washington Treaty on Limitation of Armament as approved by Great Britain, all the self-governing Dominions and India.

In connection with the provision of naval bases, attention was drawn in Resolution No. 4 to the provision of a naval base at Singapore and for the safety of the Suez Canal and Red Sea as a means of communication with the East.

Imperial Co-operation in the Past.

It is, of course, comparatively easy to formulate the *conditions* which should govern the naval policy of the Empire ; the real difficulty is encountered when an attempt is made to lay down how the *cost* is to be shared between the various people composing that Empire. It will assist to clear the ground, if the past history of the various efforts made by the Dominions overseas to contribute towards naval defence is very briefly stated. The Dominions or territories in question are India, Australia, New Zealand, Canada, Newfoundland, and South Africa.

India stands in a position differing somewhat from other parts of the British Empire, in that it is not yet administered similarly to a self-governing Dominion, and, further, maintains a very considerable standing army. India has a naval history of her own dating from the year 1612 with the Hon. East India Company's Marine. Started as a very necessary protection against pirates, and constantly engaged in combating this danger in the early years of its existence, the Indian naval forces took part in every naval action of note in their own waters in conjunction with the Royal Navy in the eighteenth and nineteenth centuries, and rendered very valuable service. Under various names, and constituted at some periods purely as a transport service,

at others as a local defence squadron, it existed until 1903, when the Royal Indian Marine was re-established for transport work. Vessels of the Royal Indian Marine co-operated with distinction with the Royal Navy during the late war, in the Suez Canal, Red Sea and Persian Gulf, and the operations in the Shat-el-arab and River Tigris. Ever since the institution of an Indian naval force, the Lascars of India have been associated with British seamen in providing the ships' companies. Since the abolition of the Indian naval defence forces as a combatant service, India has contributed a yearly sum of £100,000 towards the upkeep of the Royal Navy.

Australia and New Zealand.—There has been for very many years a feeling in Australia in favour of the maintenance of local naval forces. In early days these were provided by some of the states. Then came a period, dating from 1887, during which the British Admiralty provided a squadron of light cruisers and torpedo gunboats, towards the maintenance of which Australia and New Zealand contributed an annual sum of £146,000, raised in 1903 to £240,000.

New Zealand.—This Dominion offered in 1909 to present a capital ship to the British Navy, and H.M.S. New Zealand was accordingly built to the order of the New Zealand Government. *Australia* decided to contribute a fleet unit consisting of the battle-cruiser Australia, three light cruisers, three destroyers, and two submarines.

Canada.—The British Admiralty presented the Government dockyards at Halifax and Esquimalt to the Canadian Government between 1906 and 1910, the Dominion undertaking to maintain them. Canada purchased the two cruisers from Great Britain in 1910, Niobe and Rainbow, for use as training ships, and started a cadets training college. Many schemes were subsequently discussed for the creation of a Canadian Navy, but without result.

South Africa.—This Dominion contributed in 1898 a yearly sum of £30,000 towards the cost of the Imperial Navy. This was increased in 1902 to £85,000.

Newfoundland.—From 1902 onwards Newfoundland paid an annual sum of £3,000 in respect of the maintenance of a branch of the Royal Naval Reserve, recruited principally from the fishing population. The services of these seamen, who were largely employed in the 10th Cruiser Squadron during the war, were of great value.

Malay States.—Shortly before the war the Malay States paid for the construction of the first class battleship Malaya. Her cost was slightly less than £3,000,000. Recently they have made a free grant to the Admiralty of the land required for the naval dockyard at Singapore.

Hong-Kong.—A grant of £250,000 was made in 1924 towards the naval base at Singapore.

Position at the Outbreak of War.

The position when war broke out in 1914 may be summarized as follows :—

The Navy Estimates of Great Britain for the year 1914–15

totalled £52,705,779. In *India*, in addition to the expenditure on the Royal Indian Marine (a service not organized on a fighting basis), the sum of £100,000 was contributed towards the British Naval Estimates. In *Australia* a force comprising one battle-cruiser, two modern and two obsolete light cruisers, three destroyers, and two submarines was being maintained, the expenditure for 1913–14 having been £1,987,101. In *New Zealand* a sum of £100,000 was being paid to the British Admiralty in relief of the Naval Estimates, and a further expenditure of about £70,000 was being incurred annually in respect of the sinking fund for the construction of H.M.S. New Zealand. In *Canada* the naval expenditure in 1913–14 amounted to approximately £420,000, about one-sixth of which was for the Fisheries Protection Service. For this sum the cruisers Niobe and Rainbow were being maintained for training purposes, and recruiting for a Canadian naval force was in operation. In *Newfoundland* an annual contribution of £3,000 was being made towards the maintenance of a branch of the Royal Naval Reserve. In *South Africa* an annual contribution of £85,000 was being made towards the general maintenance of the Royal Navy.

An Empire Tour.

On the conclusion of war at the end of 1918, the authorities in some of the Dominions approached the British Admiralty with a request for advice on the subject of their future naval policy, and the Admiralty asked me to undertake a tour to India and the self-governing Dominions for the purpose of advising the various Governments on the subject. H.M.S. New Zealand was selected for the purpose of the tour and she left England in February, 1919. A stay of some six to seven weeks was made in each of the Dominions visited, viz. India, Australia and the Pacific Islands, New Zealand, and Canada. The visit to South Africa was cancelled owing to a General Election being imminent.

In visiting India, I was instructed "To advise the Government of India whether the existing naval organization requires reconsideration in the light of the experience of the war, either from the point of view of the efficiency of that organization for meeting local needs, or from that of ensuring the greatest possible homogeneity and co-operation between all the naval forces of the Empire." In the case of the self-governing Dominions I was called upon "To advise the Dominion authorities whether in the light of the experience of the war the scheme of naval organization which has been adopted, or may be in contemplation, requires reconsideration, either from the point of view of the efficiency of that organization for meeting local needs, or from that of ensuring the greatest possible homogeneity and co-operation between all the naval forces of the Empire; and should the Dominion authorities desire to consider how far it is possible for the Dominions to take a more effective share in the naval defence of the Empire, to give assistance from a naval point of view in drawing up the scheme for consideration." I was requested

by the Governments of the self-governing Dominions on arrival to consider certain definite points which were laid before me.

In reporting to each Dominion Government, strong emphasis was laid upon two points:

(1) The vital necessity for the whole of the naval forces of the Empire coming under single control (that of the Admiralty) in war-time; and (2) the exceeding importance of similarity of training, it being pointed out that without a uniform system of training and a common line of thought the naval forces of the Empire would lose much of their efficiency when acting together.

Association with the Governments and people of the overseas Dominions soon convinced me that the prospect of obtaining material assistance in naval defence was infinitely greater if the different Dominions organized and controlled their own naval forces in peace time, than if they made an annual financial contribution towards the British Naval Estimates. Indeed, in some Dominions it was freely stated that no Government could ask the people to contribute to naval defence on any other basis than that of local control. The sentiment inspiring this very natural desire on the part of the people is bound to become stronger and stronger as the various Dominions increase in population and importance.

Admiralty Views on Co-operation.

The principle received whole-hearted recognition by the British Admiralty at the Imperial Conference in 1923, as shown by the statement of the First Sea Lord at the Mansion House Banquet in November of that year. He said, " The naval forces of the Empire include those provided by the Dominions, and it does not require much imagination to look forward to the day when the Dominions as they increase in power and wealth will not only assist in guarding the sea communications in the vicinity of their own coasts, but will provide a quota of the main fleet, which is the basis of our sea power, and which forms the support for the squadrons operating on the distant ocean routes. This encourages the development of Dominion navies, and *I wish to make it perfectly clear that the Admiralty are definitely in favour of this policy, and will do all in their power to aid in the development of such naval forces as the Dominions may feel able to create.*"

The agreement expressed by the Admiralty in this policy is a matter of exceeding importance, because the opinion held and expressed by Boards in former years in favour of a financial contribution by each Dominion towards the British Navy had an unsettling effect upon a proportion of the people. In some cases the matter became almost a party question, one party arguing for the so-called local navy (*i.e.* a contribution in kind locally administered), the other party strongly urging an annual financial contribution to British Naval Estimates; the latter party could in former years quote Admiralty opinion in favour of their policy, although it never achieved any substantial result.

It is eminently desirable that the Admiralty view should be widely known in the Dominions, so that all difference of opinion on this point may disappear; and that it may lead, as I feel it will, to the people of the Dominions supporting unreservedly the policy in which the British Admiralty have expressed their belief so strongly.

It is only by means of such whole-hearted support that Governments can be prevailed upon to make adequate provision for naval defence, particularly when there is any considerable body opposed to defence expenditure in any form, whether animated (1) by the idea that a nation prepared to defend itself against aggression is adopting a provocative attitude which will lead eventually to war; (2) by the opinion that money needed for naval defence is better expended on social reform; or (3) by the notion that disarmament by one nation will lead to general disarmament by all, and that it is worth while for the country setting the example to run the risk entailed by such a proceeding.

An Imperial Naval Programme.

As a result of my Dominion tour, suggestions were put forward for India and the self-governing Dominions which were briefly as follows:—

India.—The establishment of a Royal Indian Navy as a portion of the Royal Navy. It was pointed out that while India already possessed excellent native seamen of good fighting qualities, when well trained and led by Europeans, there was at present no class from which native officers could be drawn owing to the absence of any sympathy with sea life and sea traditions amongst the educated classes from which officers must necessarily come. It was proposed, therefore, that the Royal Indian Navy should be officered, for the present at any rate, from the Royal Navy, with possible assistance from the Royal Indian Marine; but no reason was seen against the entry later of British born subjects including Anglo-Indians and Indians, if any boys of this stamp presented themselves, who in the opinion of the authorities were fit for a commission or for a cadetship. The constitution of a small Naval Board was suggested, and, as a start, it was proposed that the functions of the Royal Indian Navy should be as follows:—

(*a*) To provide part complements of Royal Navy ships on the East Indian Station.
(*b*) To man vessels forming the Persian Gulf Squadron and river gunboats on the Tigris and Euphrates.
(*c*) To provide trained crews for local defence flotillas.
(*d*) To provide a portion of the trained officers and men required to man any armed escort ships provided on the outbreak of war.

Other subsidiary duties suggested were the institution of a Royal Indian Naval Volunteer Reserve, composed of both Europeans and Indians, for harbour defence duties.

Position of Australia.

The recommendations in the case of Australia were based upon the principle of the maintenance of a fleet of considerable strength in Far Eastern waters in future years, to include sixteen capital ships. The table below gives the number of capital ships built, building, or projected at the date of the tour.

Country.	Total No. of capital ships.	Number exceeding 30,000 tons displacement.
United States	35	23
France	16	0
Japan	16	11
Great Britain	42	1

It was suggested to Australia that her share of this fleet should be based partly upon a consideration of the numerical strength of her population, and partly upon the value of her overseas trade, as compared with similar figures in the case of the United Kingdom, increased, however, beyond the percentages arrived at by this means, because the United Kingdom would be burdened not only with the cost of her share of the Pacific Fleet, but of fleets maintained in other parts of the world. It was estimated that the Australian expenditure for naval defence under these conditions would by the Financial Year 1921–22 be just under £4,000,000, and by 1927–28 would reach a sum slightly exceeding £6,000,000. Australia would then, under this scheme, have possessed :

2 battle-cruisers.
8 5,000-ton light cruisers (half in reserve).
1 flotilla leader.
12 destroyers (a proportion in reserve).
8 submarines.
1 aircraft-carrier.
1 minelayer, with minesweepers and parent craft and local defence arrangements.

It was assumed at the time that the cost of the Navy *to the United Kingdom* would be not less than £55,000,000 annually. This estimate was based on the assumption that prices generally would not greatly exceed those of pre-war time. This assumption was, of course, not realized, the cost of both construction and maintenance having remained very much higher than in pre-war days. The British Naval Estimates have, however, totalled approximately some £55,000,000 annually since 1922, although the fleet maintained for this sum has been very much weaker than that projected by me in assuming this total of cost.

Influence of the Naval Treaty.

It should be emphasized that the tour was undertaken and the advice tendered some years before the meeting of the Washington

Conference, and at a time when there did not appear to be any immediate prospect of a reduction of naval armaments on the part of the nations possessing the most powerful fleets.

The scale of suggested Dominion co-operation was consequently based upon the anticipated strength of the various navies of the world in the years immediately following the tour.

The decisions of the Washington Conference resulted in the following drastic reductions in the strength in capital ships :—

United States reduced from 35 to 18.
France ,, ,, 16 ,, 10.
Japan ,, ,, 16 ,, 10.
Great Britain ,, ,, 42 ,, 22. (To be reduced to 20 when the two new battleships are completed.)

The total tonnage of ships of the United States, Great Britain, and Japanese Navies being in the future in the proportion of 5 : 5 : 3.

Consequently it became both impossible and unnecessary to keep in the Pacific a British fleet of the size mentioned above, and the Dominion quota in ships towards such a fleet could be reduced to a corresponding degree. But, owing to the far higher cost of construction and manufacture of ships since the conclusion of the war, the British Naval Estimates have remained as mentioned above at approximately the figure on which the proposals were based. The *cost* of suggested Dominion co-operation is not, therefore, much affected, although for that cost fewer ships can be constructed and maintained.

New Zealand.—As in the case of Australia the proposals were based on the idea that New Zealand should expend on naval defence a sum proportionate in some measure to her population and the value of her overseas trade, as compared with that of the United Kingdom. It was suggested that by the Financial Year 1921–22 the cost of naval defence to New Zealand should reach a sum of £590,000, rising by the year 1925–26 to £1,166,000, at which time New Zealand would under the scheme be maintaining three 5,000 ton light cruisers, six submarines, and a parent ship, together with mobile local defence arrangements. Here, again, the strength of the force would require revision in the light of the increased cost of maintenance of ships.

Canada.—There has never been any real measure of agreement in Canada regarding naval defence, and it was very difficult to formulate proposals during my visit which would be likely to meet with any general approval. Consequently, four alternative schemes were placed before the Government involving severally annual expenditures of either £5,000,000, £3,000,000, £2,000,000, or £1,000,000. The £2,000,000 scheme was taken as the basis of naval defence contribution, and for this sum it was estimated that by 1927–28, Canada could build and maintain three 5,000 ton new light cruisers, could maintain one old light cruiser (as a training ship), one flotilla leader, four destroyers, eight P boats, eight sub-

marines, and one submarine parent ship, besides providing an Air Squadron and necessary harbour defence schemes. The more ambitious schemes were superimposed upon the £2,000,000 scheme.

Naval Needs at the Present Time.

Let us now turn to present-day requirements in respect to naval defence in the light of the limitations agreed upon at the Washington Conference. As has already been stated, the British Empire has agreed to a one-Power standard only in regard to capital ships, or, in other words, to be content with equality in this respect with the United States, thus abandoning her pre-war standard of a 10 to 6 superiority in ships of the Dreadnought type over the next strongest naval Power—at that time Germany. No limitation has been placed on the number of cruisers, although their future displacement is limited to 10,000 tons, and their armament to 8-inch guns. Nor is any restriction placed on the number and size of submarines or on the number of aircraft-carriers whose displacement is less than 10,000 tons. The *total displacement* of aircraft-carriers, belonging to each country and *larger then* 10,000 tons, is, however, limited, Great Britain here again being on an equality with the United States. Under these conditions the expenditure on the British Navy has naturally fallen very considerably since the conclusion of war, although high prices keep it, for a very much weaker fleet, above the level of pre-war estimates. The figures are :

	£
1919–20	154,084,044
1920–21	92,505,290
1921–22	75,986,141
1922–23	57,492,389
1923–24	54,064,350
1924–25 (estimated)	55,800,000
1925–26 (estimated)	60,500,000

The real increase of the 1925–26 over the 1924–25 estimates is approximately £2,000,000, the remainder being for services not hitherto shown under the Naval Estimates, including a sum of £1,320,000 for the Fleet Air Arm.

The estimates for 1925–26 did not provide for the laying down of any new ships, though the urgent necessity for such provision was evident in view of the building programmes of some of the leading naval Powers.

The Cruiser Problem.

The position in this respect is as follows :—

Great Britain at the conclusion of the war possessed a large number of modern light cruisers. Many of the vessels, which bore the stress of war conditions, have now approached the obsolescent stage. This process of obsolescence was hastened by the provision of the Washington Conference which limits new construction in cruisers to a displacement of 10,000 tons, because such a provision

obviously tends to compel naval authorities in all countries to lay down new vessels up to this size, in order to avoid their being out-matched by foreign competitors, displacement being always synonymous with power.

Many of the British cruisers built during the war were of less than 4,000 tons displacement, others just exceeded that figure. They were largely designed for use in Home Waters, and by reason of their small fuel capacity are not suitable for service in the wider seas. None of them exceeded 5,000 tons displacement, although four of those building at the time of the Armistice displaced nearly 10,000 tons. The cruiser position, including Dominion ships, is as follows :—

TABLE A.—SHIPS BUILT, BUILDING OR PROJECTED.
(Less than 15 years old.) (For names of ships see comparative tables.)

	Vessels of 5,000 tons or less.		Between 5,000 and 8,000 tons.		Between 8,000 and 10,000 tons.	
	Built.	Building or projected.	Built.	Building or projected.	Built.	Building or projected.
Great Britain	34 *	Nil.	12 †	2	4	11 ‡
U.S.A. . .	Nil.	Nil.	10	Nil.	Nil.	8
Japan . .	6	Nil.	11	7	Nil.	4
France . .	3	Nil.	1	3	Nil.	6
Italy . . .	10	Nil.	Nil.	Nil.	Nil.	5

* At least twelve of these ships have a limited radius of action.
† Including those ships of the Chatham type placed on sale list, September, 1925.
‡ Including two Australian cruisers projected, and four British cruisers recently approved for the financial year 1925–26.

THE LIFE OF A CRUISER.

Four cruisers are to be laid down by Great Britain during the present financial year, in accordance with the decision reached by the Government in July. Assuming that a period of three years is required to build a cruiser, the position as regards *completed* cruisers less than fifteen years old,* at the end of 1928 will be :

TABLE B.—CRUISERS AT THE END OF 1928.

	Vessels of 5,000 tons or less.	Between 5,000 and 8,000 tons.	Exceeding 8,000 tons.
Great Britain	34 †	6	13 ‡
U.S.A.	Nil.	10	8
Japan	3	18	4
France	2	4	3
Italy	8	Nil.	5

* Fifteen years is taken as the effective life of a cruiser. The stress of war service to which our older cruisers were subjected might even shorten this effective life in many cases.
† At least twelve of these ships have a limited radius of action.
‡ Including two Australian cruisers projected, and assuming that they and two of the British cruisers in the 1925–26 programme are laid down before January 1, 1926.

A glance at the figures in the table above will show how very serious is the position. Great Britain is rapidly losing her superiority in cruiser strength, and the situation will grow more acute with each year that passes because so many of the British cruisers were built during war years, and will disappear from the effective list in great numbers between the years 1927–33. The number thus due for removal on account of attaining 15 years of age is:

	British Empire.	Japan.	U.S.A.
In 1927	3	3	Nil.
1928	3	Nil.	—
1929	3	—	—
1930	7	—	—
1931	6	—	—
1932	6	—	—
1933	7	—	—

The British cruiser programme recently put forward by the Admiralty in Command Paper No. 2476 provides for laying down the following cruisers during the financial years 1925–26 to 1929–30, viz.:

	1925–26.	1926–27.	1927–28.	1928–29.	1929–30.
Class A (10,000 tons) . .	4	2	1	1	1
Class B (8,000 tons) . .	—	1	2	2	2

It will be seen from the above that the programme does not provide for replacement at nearly the rate at which cruisers disappear from the list on account of age, if the effective life of a cruiser is assessed at fifteen years from date of completion; and that the British position grows steadily worse in comparison to that of Japan and the United States.

If a period of twenty years was accepted for the life of cruisers instead of fifteen years, the figures in the foregoing tables would need alteration. It is right to emphasize, however, that war experience shows that fifteen years is the figure which should be adopted.

TABLE A[1].—TWENTY-YEAR PERIOD. PRESENT POSITION.

(Less than 20 years old.)

	Vessels of 5,000 tons or less.		Between 5,000 and 8,000 tons.		Between 8,000 and 15,000 tons.*	
	Built.	Building or projected.	Built.	Building or projected.	Built.	Building or projected.
British Empire . .	34	Nil.	12	2	4	11
U.S.A.	3	Nil.	10	Nil.	10	8
Japan	7	Nil.	11	7	Nil.	4
France	4	Nil.	1	3	6	6
Italy	10	Nil.	Nil.	Nil.	3	5

* The limit is 15,000 tons in this table instead of 10,000 tons as in Table A, because the twenty years' limit brings in several of the older large cruisers.

TABLE B[1].—TWENTY-YEAR PERIOD. POSITION AT THE END OF 1928.

	Vessels of 5,000 tons or less.	Between 5,000 and 8,000 tons.	Between 8,000 and 15,000 tons.
British Empire	34	11	13 *
U.S.A.	Nil.	10	2
Japan	7	18	4
France	4	4	7
Italy	10	Nil.	6

* Including two Australian cruisers and two British cruisers of the new programme.

TRADE PROTECTION.

Trade protection is largely dependent upon cruiser strength, although cruisers can be supplemented to some extent by armed merchant ships, as was done in the late war; but no merchant ship is a match for the weakest of cruisers, largely owing to the vulnerability of her machinery and boilers.

	British.	Allied.	Total.
North Atlantic :			
Battleships (acting as cruisers)	1	—	1
Cruisers	19	4	23
Armed merchant ships	4	—	4
Mid Atlantic :			
Cruisers	2	—	2
Armed merchant ships	2	—	2
South Atlantic :			
Battleships (acting as cruisers)	2	—	2
Battle-cruisers	2	—	2
Cruisers	11	—	11
Armed merchant ships	4	—	4
East Indies :			
Battleships (acting as cruisers)	3	—	3
Cruisers	7	1	8
Royal Indian Marine and armed merchant ships	12	—	12
Pacific :			
Battleships (acting as cruisers)	1	1	2
Battle-cruisers	1	—	1
Cruisers	4	12	16
Totals	75	18	93
	British.	**Allies.**	**Grand Total.**
Total Forces :			
Battleships	7	1	8
Battle-cruisers	3	—	3
Cruisers	43	17	60
Armed merchant ships	22	—	22
	75	18	93

It is difficult to understand how there can be any doubt as to the very serious decline in the protection afforded to the sea-borne trade of the Empire as revealed by the foregoing figures. The most striking proof of this decline is, perhaps, obtained by reviewing

the position during the first six months of the late war, when Germany had still at sea and unlocated Von Spee's squadron of two armoured cruisers and three light cruisers, when the two light cruisers Emden and Karlsruhe were also still at large, and a number of German merchant ships were interned in United States ports, which needed watching.

Immediately prior to the Battle of the Falkland Islands, the British and Allied cruiser forces, employed in the protection of trade in the outer seas were disposed as in the table on previous page.

This large force of vessels, needed, as has been stated, to protect trade from the depredations of German cruisers and, at the same time, to hunt down and destroy these vessels, was entirely supplementary to the very considerable number of cruisers necessarily employed in and near the North Sea and in the Mediterranean. We had employed on this service at the period in question a total of 38 cruisers and light cruisers, a force which, it was well known at the time, was none too large for the duties which it was called upon to perform.

If this total of 109 cruisers, and vessels acting as cruisers (exclusive of armed merchant ships), be compared with the maximum number (58) we might possess in 1928, the gravity of the position is apparent.

Submarines and Destroyers.

As regards *submarines*, which are a menace to trade and particularly to trade protection, the number possessed at present by the leading naval Powers and the number that they will possess of an age of less than ten years by 1927 * is shown below:

Country.	Number at present.	Number in 1927.
Great Britain	62	56
United States	114	114
Japan	45	56
France	43	47
Italy	42	36

The programme for construction of submarines as given in Command Paper No. 2476 provides for six new submarines in each financial year from 1926–27 to 1929–30. Japan, the United States, France, and Italy have also programmes for future years.

Flotilla Leaders and Destroyers.

The number of vessels of these classes possessed by the leading naval Powers from the years 1925 to 1929 are given in the table below, which allows twelve years for the effective life of a destroyer,

* Ten years is the usually accepted effective life of a submarine, and a period of two years is allowed for construction. Any variations between these totals and those in the Comparative Tables on p. 52 are due to the difference in date at which the comparisons were made, and do not in any way affect the argument based thereon.

and which includes the programme of destroyer construction given in Command Paper No. 2476, a period of two years being allowed for construction:

	1925.	1926.	1927.	1928.	1929.
British Empire	200	198	177	148	129
United States	274	267	265	257	250
Japan	74	78	85	83	82
France	40	52	50	56	61
Italy	57	52	57	50	43

These statistics show that, however great may be the desire to reduce armaments, either from the humanitarian point of view, or to lessen the burden upon the taxpayer, or to provide money for social objects, it is manifestly impossible to effect a reduction on the present total of naval expenditure, unless of course some new agreement is come to among the nations. It is obvious if we intend to guard adequately the sea communications of the Empire, we must continue to lay down new cruisers and submarines in future years. If that truth is not apparent to the respective Governments and people of the Empire, the lessons of the late war, and all the heavy sacrifices which were made, have already been forgotten.

Influence of War Experience.

In order to emphasize the absolute necessity for a large number of cruisers for trade protection, I would further recall to memory such facts as (1) the time taken by a force of ten cruisers, two armed merchant ships, and two sloops to hunt down the Emden; (2) the fact that eleven cruisers and two armed merchant ships were engaged in August, 1914, without success, in seeking for the Karlsruhe and Dresden; (3) the depredations on trade effected by the German light cruisers Emden and Karlsruhe, and the disguised armed merchant ships Moewe and Wolf, as indicated in the table below:

Ship.	No. of weeks at large.	No. of British vessels captured or sunk.	No. of Allied vessels captured or sunk.	No. of neutral vessels captured or sunk.
Light cruiser Emden	8½	23	0	5
Light cruiser Karlsruhe	10	17	0	2
Disguised and armed merchant ship Moewe, 1st cruise	7	13	2	0
Disguised and armed merchant ship Moewe, 2nd cruise	15	22	5	4
Disguised and armed merchant ship Wolf	40	20 (including 14 mined)	5	2

The time is drawing near, if indeed it has not already arrived (as indicated by the recent controversy on the subject of the cruiser programme put forward by the Admiralty), when Great Britain can no longer shoulder the heavy financial burden which now lies on her

in regard to naval defence, and unless the remainder of the Empire gives further assistance, there is a real danger that the protection to the overseas trade of the Empire will rapidly become inadequate.

Opinion in the Dominions.

Four years' residence in New Zealand convinced me that there is a great and growing desire in that Dominion, which is shared, I believe, in the Sister Commonwealth of Australia, to shoulder more of the burden involved in the naval defence of the Empire. The New Zealand Press generally has, during the last two years, consistently advocated this course, and the Navy League all over the Dominion has been very active in its endeavours to impress upon the people their absolute dependence on the safety of sea communications and the duty which lies before them in this respect. Through the efforts of the Navy League, the school children are being made familiar with the responsibilities and activities of the Navy, and much is being done to educate public opinion as a whole on this important subject, for it is only public opinion in the end that makes its influence felt upon Governments.

The necessity for action on the part of Dominion Governments will be appreciated by a study of the following table, which indicates how the financial burden of naval defence was shared at the beginning of 1924 among the countries composing the British Empire, together with the total sea-borne trade of the country in question for the twelve months ending in 1924:—

Country.	Expenditure per head of population on naval defence.	Total value sea-borne trade.
	£ s. d.	£
Great Britain	1 4 10	2,326,916,857
Australia	8 0	260,105,457
New Zealand	8 0	101,140,314
Canada	3½	186,752,368
South Africa (white population)	1 9	139,605,613
India	—	505,351,016

The very important building programme instituted recently by the Australian Government with such fine Imperial vision will largely increase the naval expenditure of the Commonwealth. This Australian programme, involving the construction of two 10,000 ton cruisers, two submarines, and a seaplane carrier, is to be spread over a period of two to three years, and the cost (nearly £6,000,000) will involve an increase in the Naval Estimates, which will bring the total to approximately £5,000,000 by 1926–27. Similarly the acquisition and maintenance of a second cruiser, the Diomede, by New Zealand will add to the naval expenditure of this Dominion by some £220,000 annually, including additional expenses connected with training, bringing the total (including the annual contribution towards the cost of H.M.S. New Zealand) to approxi-

mately £650,000. Under these conditions, the approximate expenditure per head of population will become for Australia 17*s.* 3*d.*, and for New Zealand 10*s.*

Cost of the Singapore Base.

The construction of the Singapore base is of immense importance to the Pacific Dominions, and the estimates given in the preceding paragraph are exclusive of any contribution which either Australia or New Zealand may make towards its cost. That this importance is fully realized is shown by the following extracts from the telegrams sent by the respective Prime Ministers when the late Government at Home proposed to abandon work on the base :—

From Australia :

We believe that the existence and prestige of the British Empire has been, and is, the greatest factor in the maintenance of the peace of the world.

To the active support backed by prestige and strength of the British Empire has been due the measure of success which has been achieved by the League of Nations since its inception.

Our strength relative to other great Powers has been the basis of the influence for peace which we have wielded in the councils of the nations and through the League of Nations.

That strength has depended mainly on the British Navy, its power and mobility. We are convinced a base in the Pacific is imperative for that mobility.

The existence and prestige of the Empire will be imperilled without it. We believe that such a result would be a menace to the peace of the world and a fatal blow to the League of Nations.

* * * * * *

Further, unless we have a base in the Pacific, that quota of capital ships permitted by the Washington Conference cannot be maintained by Britain in these now important waters.

That Conference never contemplated this eventuality, the occurrence of which would necessarily destroy the influence and power of the British Empire in the Pacific to secure further reductions of naval armaments.

While, therefore, we appreciate your desire to promote a friendly understanding among the nations, we do not agree that the carrying out of a programme so long and widely known and so essential to altered circumstances would reflect on your good faith, or that it would jeopardise the establishment of that confidence necessary to success.

As a more practical contribution to the principles which you have enunciated, and with which we cordially agree, we suggest that the construction of the base should be immediately proceeded with, but that, should a suitable opportunity offer itself, the abandonment of the base should be used as a means of reaching an agreement for further mutual reductions of armaments.

Therefore, on behalf of our Commonwealth, which has on every possible occasion proved its loyalty to the Empire, we urge you even at this late hour to reconsider your decision.

* * * * * *

From New Zealand :

Owing to the alteration in ship designs since the Great War, I may remind you that docks which before 1914 would have taken certain classes of warships, will not now accommodate ships of similar tonnage, and so the present standard of naval efficiency cannot be maintained without effect being given to the proposals regarding Singapore.

I protest earnestly on behalf of New Zealand against the abandonment of the proposal to make Singapore a safe and strong naval station, because I believe that the Empire will stand as long as Britain holds the supremacy of the sea, but, if naval supremacy is lost by Britain, the Empire may fall, to the detriment of humanity as a whole as well as of its own people, and it is surely the duty of the British Parliament and British Ministers to see that there will be no danger of such a catastrophe so far as it is humanly possible to prevent it.

* * * * * *

Burdens of the Mother Country.

While Australia and New Zealand are materially increasing their co-operation in naval defence, the remainder of the self-governing Dominions and India are, as yet, taking but a very small part in relieving the Mother Country of the burden which presses so hardly upon the British taxpayer; though India, I believe, is preparing to inaugurate a more forward policy. Until the other Dominions co-operate to a considerably greater extent, the task of the Government of the two Southern Pacific Dominions is one of difficulty. The people in these Dominions naturally hesitate to shoulder a burden from which other parts of the Empire shrink. This may tend to a weakening of that feeling of brotherhood by which the Empire is united. Such a result would be deplorable.

A policy which would assist the Mother Country very materially would be one by which each Dominion overseas agreed to devote a sum towards strengthening the Imperial Navy, which, while less per head of population than that paid by the people of Great Britain, would not be unduly small in relation thereto. It must be borne in mind that considerable sums of money are still required in our Overseas Dominions for clearing and for development of the land, for road making, railway construction, improvement of harbours, building of public institutions, etc., and it cannot be expected that quite the same amount of money can be provided *per capita* for naval defence as is given in the Mother Country.

Let it be assumed that for the next few years the sum needed for the Navy of the Empire will total about £69,000,000 annually. It is difficult to see that a less sum will be sufficient. If it were possible for the Dominions to come to a general agreement to contribute in kind towards this cost at the rate of, say, 17*s.* per head of population, while Great Britain and the Irish Free State (the older portions of the Empire), gave at the rate of 23*s.* per head, the figures would work out as follows:—

	£	s.		£	
Great Britain and Irish Free State	1	3	per head, producing	54,500,000	approximately.
Australia		17	,,	4,800,000	,,
New Zealand		17	,,	850,000	,,
Canada		17	,,	7,200,000	,,
South Africa (white population)		17	,,	850,000	,,
India a sum of, say . .				850,000	,,
		Total	. . . .	69,050,000	

Under these conditions considerable relief would be afforded to the British taxpayer, and the Navy could be maintained at adequate strength.

What the Dominions could do.

For these sums the Dominions overseas could, it is thought, maintain at a later date naval forces of the following approximate strength, and at the same time have in action a sufficient building programme to keep up the strength of the naval forces:—

Australia.—

	£
Three 10,000 ton cruisers in full commission	800,000
One 10,000 ton cruiser in reserve	58,000
Four submarines in full commission	228,000
Two submarines in reserve	50,000
One aircraft carrier in full commission	300,000
Auxiliary patrol vessels	200,000
Total	1,636,000
For new construction, say	800,000
Grand total	2,436,000

Leaving a sum of £2,364,000 for administration and training services, provision and maintenance of naval aircraft, harbour defence, provision of fuel reserves and naval bases, etc.

New Zealand.—

	£
Two "D" class light cruisers in full commission	400,000
One "D" class light cruiser in reserve	40,000

Leaving for administrative services, training, provision and maintenance of naval aircraft, harbour defences, provision of fuel reserves and naval bases, payment for H.M.S. New Zealand, and eventually nucleus of a new construction fund £410,000.

Canada.—The first consideration would be a programme of new construction. Assuming that Canada would aim at providing a squadron of four cruisers within the next four years, the annual cost would be for new construction, approximately, £2,000,000. During this period it would be necessary to recruit and train up the necessary personnel. Seeing that the actual maintenance of a squadron of four cruisers (one in reserve) would be approximately £858,000, Canada—if prepared to contribute towards naval defence at the rate of 17*s*. per head of population—could afford to extend her programme to an amount even exceeding considerably the Australian naval forces. Under these conditions she would doubtless provide one or two additional cruisers, submarines to the number of six or nine, and possibly an aircraft-carrier, or naval airships. Her numerous harbours would necessitate the provision of auxiliary patrol vessels, and anti-submarine craft.

South Africa.—The position of the Union of South Africa would be similar to that of New Zealand so far as contribution is concerned, and it would probably be considered desirable to maintain either two 10,000 ton cruisers or three smaller vessels.

India.—The position of India differs from that of the Overseas Dominions, and since the matter forms the subject of consideration by the Government of India at the present moment, it is not proposed to attempt to indicate the direction in which assistance could be rendered to Imperial Naval Defence by the Indian people, but the annual cost is assumed to be equal to that shown in the table for New Zealand and South Africa.

The Crown Colonies.

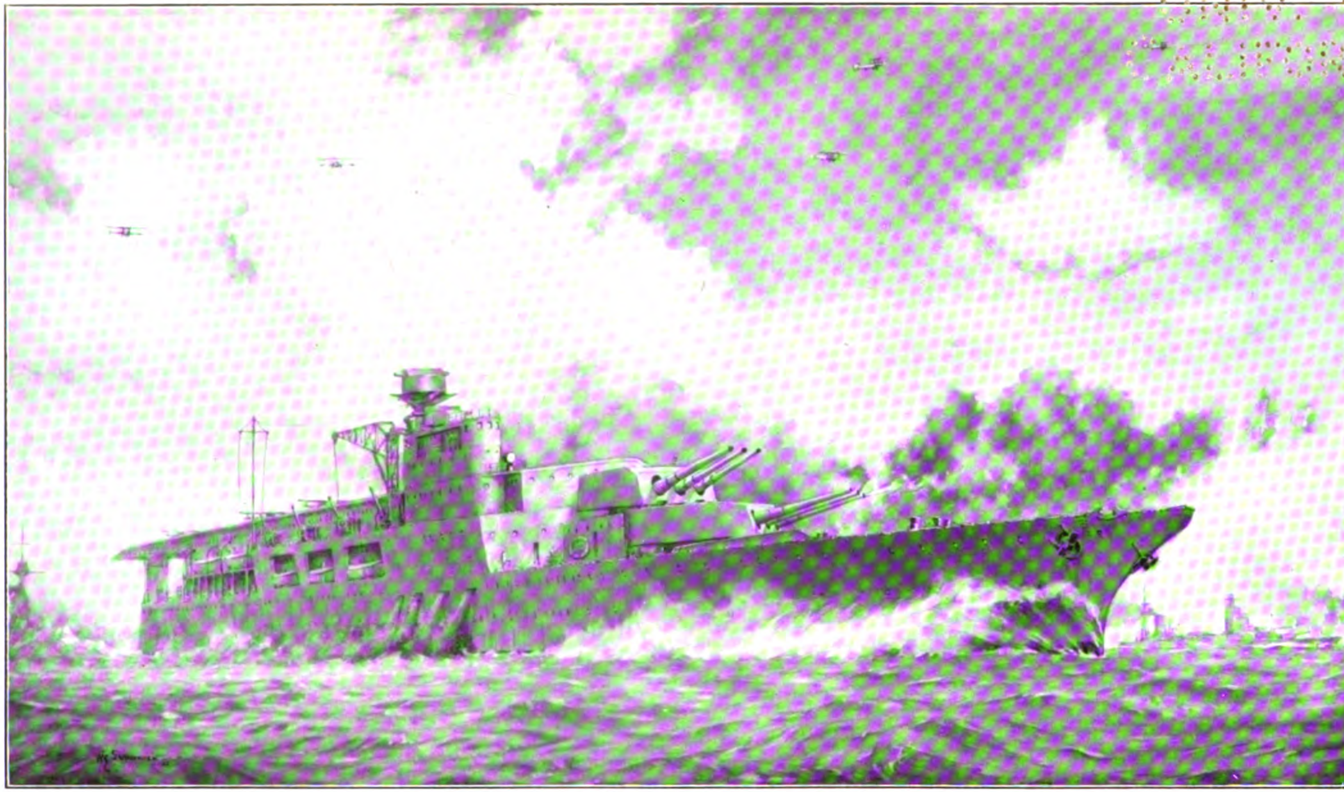
Although many of the Crown Colonies may be as yet unable to make any substantial contribution towards Naval Defence, it is to be hoped that the example set by the Malay States and Hong-Kong will be borne in mind. Assistance from the Colonies on some scale, however small, would be helpful, not only as a material factor in lessening the burden on the Mother Country, but as a testament also to the doctrine of Imperial Unity.

An Urgent Need.

I have endeavoured in this article to bring home to the people of the Empire, and more particularly to our kinsmen in the Dominions, the urgent need for co-operation in, *first,* deciding upon a naval policy, and, *secondly*, in carrying out that policy.

In past years, when the Dominions were but thinly populated, and when the energies of the people were devoted mainly to developing the country, the Motherland was ever ready to provide and pay for the men and ships on which the Empire depends for its security. Even so, in the years immediately preceding the Great War, and since its conclusion, the Dominions were ready to help in a greater or less degree. But the situation consequent on the war has now made such assistance imperative. Heavy taxation, serious decrease in trade, and the maintenance of large numbers of unemployed, have crippled the finances of the Motherland to a most serious extent, and there is little doubt that, if more help is not forthcoming from the Dominions, the Navy will slowly but surely become inadequate for its work. Is it not possible for all the Dominions to agree to face the situation and to come equally to the assistance of the Motherland, so that each portion of our great Empire may bear a share of the burden proportionate to its population? For it is on the Navy, under the good Providence of God, that the wealth, safety, and strength of the Empire chiefly depend.

Jellicoe.



(From a drawing by H. G. Swanwick.)

BATTLESHIP AIRCRAFT CARRIER WITH SIX 16-INCH GUNS.

General View.

CHAPTER V.

Battleship or Aircraft Carrier?

It was little realized at the time the proposals of the Washington Conference of 1921–22 were finally approved and adopted by the principal maritime Powers, how seriously such decisions were to affect the problems to be solved by those responsible for the design and construction of fighting ships.

The limitations placed upon future battleships and cruisers were such as in no case to allow of the production of the most satisfactory fighting unit of either type, and in view of the controversy now being waged as to what constitutes a battleship as distinct from an aircraft carrier, it would appear that some more definite line should have been drawn by the Conference in relation to new types.

In the United States there is, undoubtedly, anxiety and suspicion as to the capabilities of the two British battleships Rodney and Nelson now under construction in this country, more especially with regard to their plane carrying capacities. So marked is this anxiety that Senator McKellar on January 21, 1925, moved a resolution asking the President to ascertain and inform the Senate :

1. Whether the Nelson and Rodney are battleships or aircraft carriers.
2. If they are combined battleships and aircraft carriers, whether or not such ships, as aircraft carriers, do not violate the article of the treaty limiting the calibre of guns to eight inches.
3. Whether, as aircraft carriers, they did not violate the restrictions as to size.

Such action was no doubt in part due to the reports received from England as to the characteristics of these vessels, for in the *New York American* of January 22, 1925, it was stated that "cable despatches from London describe them as being the most powerful and destructive weapons of warfare ever constructed by any nation, and as combined floating fortresses and aerodromes."

The *World* of January 26, 1925, states that "the two American scout cruisers which are being converted into airplane carriers will carry about 150 planes, or little less than twice the number the two British battleships are credited with being able to carry," and goes on to say that "while many officers feel that the placing of so large a number of planes on a battleship would not be in keeping with the spirit of the naval treaty, they concede that the British would be within the letter of the agreement."

Influence and Effect of the Washington Treaty.

The reason for this suspicion in the United States as to Britain's new construction is not far to seek if the terms of the treaty are carefully analysed. New battleships are restricted to 35,000 tons per unit with 16-inch as the maximum calibre gun to be fitted, without restriction as to number; without restriction as to the speed or protection of the vessel or the number of planes allowed to be carried. Any new aircraft carrier is restricted to 27,000 tons per unit, with 8-inch as the maximum calibre gun, without restriction as to speed or protection, but permission is granted to modify instead of scrapping certain existing units, even if such exceed the tonnage allowed to individual units, so long as the maximum aggregate tonnage is not exceeded.

The maximum tonnage of capital ships allowed by the treaty is as follows :—

Great Britain	525,000 tons
United States	525,000 „
Japan	315,000 „

which allows for new construction in :

Great Britain	Rodney and Nelson, 70,000 tons
United States	Two vessels of the West Virginia class, 65,200 tons
Japan	Nil.

The maximum tonnage allowed to aircraft carriers by the treaty is as follows :—

Great Britain	135,000 tons
United States	135,000 „
Japan	81,000 „

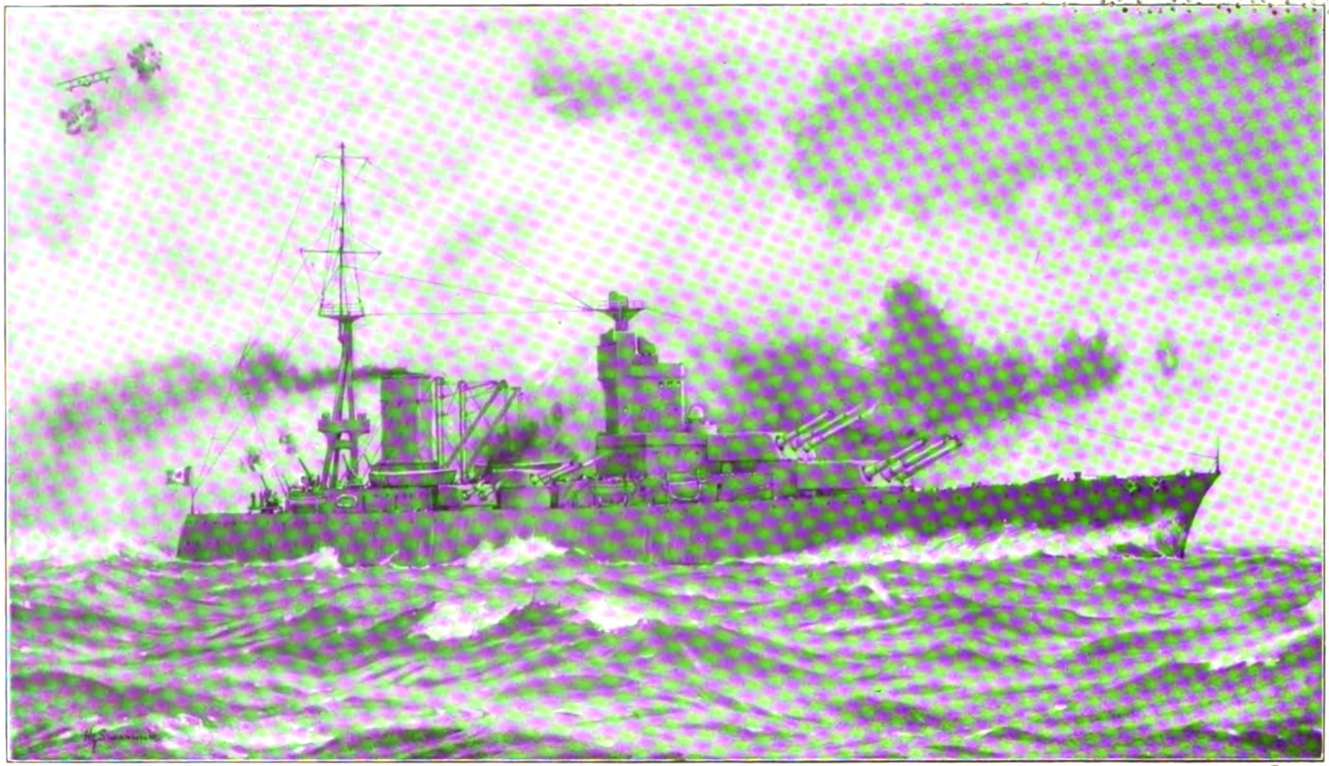
which allows for new construction, after including vessels altered or now being modified as carriers, as follows :—

Great Britain	22,700 tons
United States	56,300 „
Japan	17,500 „

So far as can be ascertained at the moment, all the contracting parties, namely, Great Britain, United States, Japan, France, and Italy will determine, where new construction of capital ships is involved, to accept the 35,000 tons as laid down, including all the restrictions attached thereto for the capital unit, although there would appear to be a wide divergence of view by the contracting parties as to the most effective size for the aircraft carriers, but in many cases the maximum of 27,000 tons per unit is not likely to be reached.

Utilization of Tonnage Ratio.

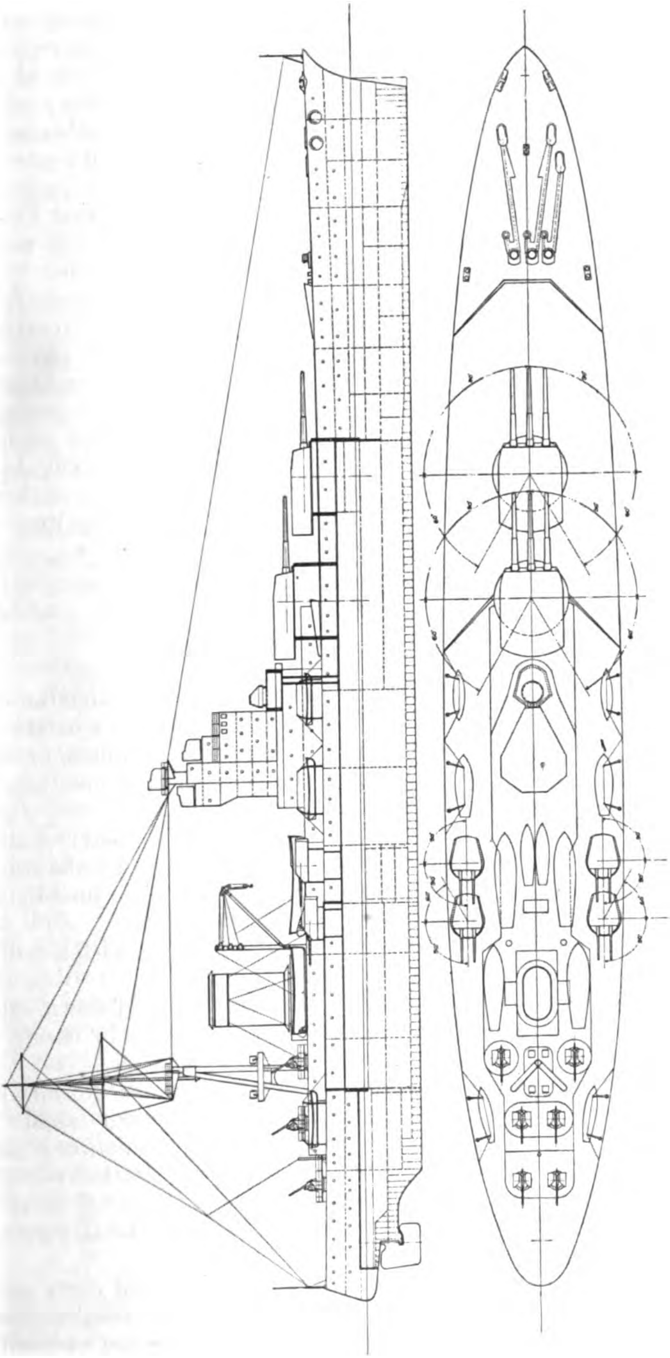
The distribution and utilization of available tonnage allowed to the various contracting parties for battleships having been more or less decided by their adoption of the 35,6C0 tons standard for the capital ship, the question arises as to what type the maritime nations outside the Conference may adopt when the problem



(*From a drawing by H. G. Swanwick.*)

BATTLESHIP OF 26,500 TONS.

Having a speed of 26 knots and carrying six 16-inch guns.



DESIGN FOR A BATTLESHIP OF 26 KNOTS SPEED.

Length, 600 ft.; displacement, 26,500 tons; speed, 26 knots; armament, six 16-in., eight 6-in., six 4·7-in. H.A.

of new construction arises, as it undoubtedly will. They have, in the first place, to decide for themselves the relative merits of the capital ship and aircraft carrier under modern developments in naval warfare, with particular reference to the defence of their own country, and will assuredly be brought up against the problem, which so much worries the American Senate, as to combining the features of the battleship and aircraft carrier in one hull, or separating them.

To put it frankly, few, if any, outside the contracting Powers can afford the luxury of a battle squadron of 35,000 ton capital vessels with the accompanying and necessary units of other types, of which the aircraft carrier must now be looked upon as forming a vital adjunct. Such Powers must of necessity carefully consider whether some alternative cannot be found to safeguard their interests. For whilst they are under no obligation to come within the terms of the Washington Conference, they will probably endeavour to work within the lines of that treaty so far as their own interests will permit. In my opinion, it is more than probable that naval units constructed under such conditions may seriously modify new construction yet to be carried out during the duration of the treaty even by some of the contracting parties.

The Limitations of the Treaty.

At this stage it is necessary to have a definite understanding as to whether the carrying of a large number of planes in a battleship violates the principles of the treaty, or whether the tonnage of such vessel should be deducted from the tonnage allowed for capital ships or from that allowed for aircraft carriers.

With respect to capital ships, Article 5 of the treaty states: "No capital ship exceeding 35,000 tons standard displacement shall be acquired by or constructed by, for, or within the jurisdiction of any of the contracting Powers."

Article 6 states: "No capital ship shall carry a gun with a calibre in excess of 16 inches."

Article 12 states: "No vessel of war hereafter laid down other than a capital ship shall carry a gun with a calibre in excess of 8 inches."

With respect to aircraft carriers, Article 9 states: "No aircraft carrier exceeding 27,000 tons standard displacement shall be acquired by or constructed by, for, or within the jurisdiction of any of the contracting Powers;" but it goes on to state that any of the contracting Powers may build not more than two aircraft carriers not exceeding 33,000 tons with a proviso that the total tonnage allowance is not exceeded.

Articles 9 and 10 state that no aircraft carrier shall carry guns with a calibre exceeding 8 inches, and in such case the total number of guns carried, excluding anti-aircraft guns and guns not exceeding 5 inches, shall not exceed eight, if between 6 inches and 8 inches, ten, and if not exceeding 6 inches, unlimited.

A careful analysis of the foregoing would seem to show that any vessel constructed by any of the contracting parties for purposes of war, if carrying guns exceeding a calibre of 8 inches, falls within the category of capital ships, and there are apparently no restrictions placed on these save in relation to displacement and gun calibre, and an answer on these lines would, by the way, appear to be sufficient reply to those who have thought fit to raise the question in the American Senate.

The Evolution of a New Type.

Taking the foregoing as a correct interpretation of the Washington conditions, it is a logical conclusion to assume that the Government of any of the maritime nations not embraced in the Washington pact, having decided upon a scheme of naval construction, may wish, if possible, to keep within the Washington limits if by so doing their defence is not jeopardized. So, having a given sum allocated to such purpose, it would endeavour to ascertain if it were possible to devise an entirely new type of capital ship which, whilst not specially designed to take part in a line action with fleets of any of the contracting parties, would possess powerful offensive, defensive, and commerce-destroying qualities, having as one of the main features a powerful equipment of planes.

In "Brassey's Naval Annual" of 1923, I outlined as a matter of possible interest what I termed an experimental battleship, retaining the 35,000 tons standard displacement, reducing the armament to three 16-inch guns, fitted forward, dispensing with funnels and providing a plane equipment for scouting, torpedo and bomb dropping. I was gratified to find that although I had simply put the project forward as a possible unit of future construction, Vice-Admiral Amet, in his paper read before the Association Technique Maritime et Aeronautique, 1924, stated that such type was suitable to the French Fleet for carrying out essential duties, and that, protected as she was, she would be capable of sweeping aside lighter forces intent upon suppressing French communications with Africa. Such an opinion, coming from Vice-Admiral Amet, proved to me that the proposed combination of battleship and aircraft carrier was not illusory but a practical idea of great significance.

I mention the matter because, to my mind, it is unlikely that countries outside the pact will restrict themselves to cruiser construction or spend huge sums on isolated capital ship units, so that, sooner or later, some combination of a high-speed battleship and aircraft carrier must eventuate, and before outlining the characteristics of such type it is necessary to consider the possible uses of the craft and the duties devolving upon her.

The Position of Non-Contracting Powers.

For the moment let us consider the countries within the pact as outside the pale of any modified construction in this direction, due, in the first place, to their adherence to the treaty, and, in the

second place, to the desire to oppose equal unit to equal unit within the pact, so that, strangely enough, it is countries outside the Conference that will probably lead the way in new types.

Assuming, then, that one of the maritime countries outside the pact should have the courage and initiative to adopt an entirely independent line of action and determine on the construction of capital ships suited to their own particular needs rather than in strict conformity with the types outlined at Washington, the first consideration would be the forces likely to be opposed to them. Speaking generally, if the lessons of the late war are taken into account, these would consist of more or less antiquated types of battleships and cruisers with displacements, with the exception of the Almirante Latorre, Moreno, and Rivadavia, not exceeding 20,000 tons, speeds, to-day, probably not exceeding 21 knots, with out-of-date primary armaments consisting of guns not exceeding 12-inch calibre.

In addition to this, such Government would have to take into account the remote possibility of conflict with one of the pact Powers with their powerful but comparatively slow capital ships, or their fast, but not battleship armed, 10,000 ton cruisers, bearing in mind that the latter type might also by that time have been adopted by their immediate neighbours outside the pact. The fact that all fleets would have their escort of aircraft carriers and destroyers would also have to be duly considered in determining the final qualifications of the new type of primary unit for a fleet of limited dimensions.

Problems of Speed and Armament.

It would appear evident that the speed of the new unit should not only be greater than that of the existing capital ships of opposing countries, but that it should also be greater than that of capital ships under the Washington Conference. The primary armament should be more powerful in range and striking effect than in existing ships of possible opponents, and be such as to afford reasonable possibility of inflicting vital damage to ships of the Conference type if suddenly confronted with the necessity of fighting such vessels before the greater speed would allow of withdrawal from the danger zone.

The secondary armament, taking into account the purposes for which the vessel is designed, should, in my opinion, consist only of the largest and most powerful anti-aircraft guns; the most effective at the present moment are the 4·7's, these, being of modern design and with an all-round elevation, would not only be capable of dealing with any attack by aircraft, but would have a range equal, if not superior, to that of the auxiliary armament of vessels likely to be brought against them, whilst the protection, although somewhat less than that of the Conference capital ships, would be immeasurably superior to that of any of the Washington cruisers.

Finally, the question of aircraft equipment, whether in the proposed unit or in separate craft, is a matter of paramount importance, in view of the development of air service. In such countries as the

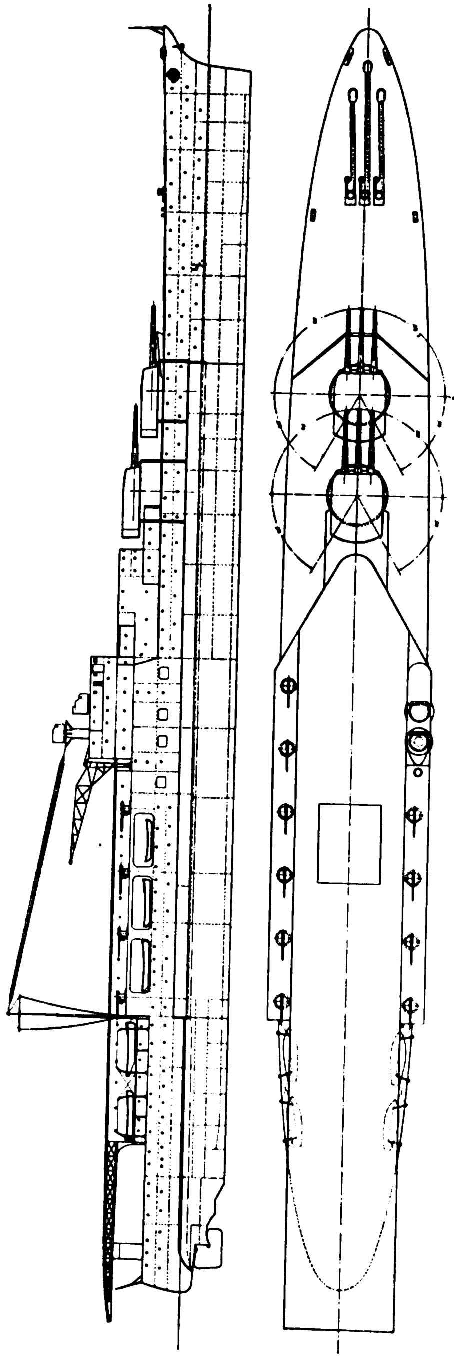
one assumed, financial possibilities will to a large extent influence naval decisions, so that it is more than probable that an attempt will be made to adapt the unit in question for aircraft carrying, and so effect a saving through not having to construct a special type for such purpose.

In these circumstances two lines of action appear to me to be open to the naval authorities, the first to design a craft fitted for taking its place in line of battle so far as armament, protection, and speed are concerned, fitted at the same time with more or less powerful plane equipment for scouting, bomb and torpedo dropping. Two units of this type could be constructed and still leave a margin of 14,000 tons if compared with two of the Washington units. The second course is to design a primary unit of sufficient power and speed to be capable of dealing with any likely opponent, and yet of such dimensions that it would be possible to construct two of such type and still leave a margin of 17,000 tons if compared with two units of the Washington type. As these latter vessels would be unable to accommodate the requisite number of planes, it would be necessary to augment the programme by the addition of aircraft carriers pure and simple, the probability being that in such case they would be comparatively small in dimensions but of high speed.

The Design of the "Battleship Plane-carrier."

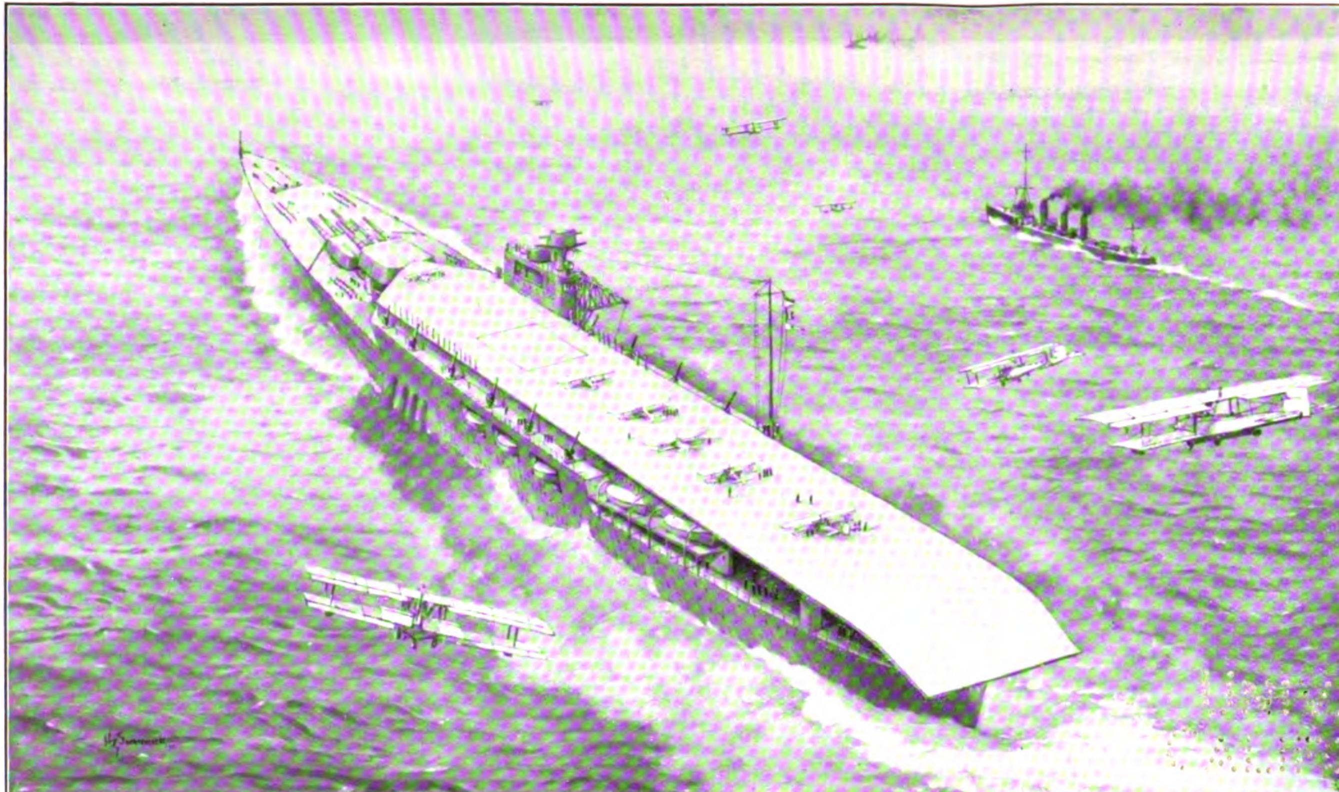
To deal first with the combined battleship and aircraft carrier, which might possibly, for convenience, be referred to as a battleship plane-carrier, and assuming, for instance, that one or other of the South American States decided to construct such a vessel, it would be necessary, in the first place, to determine the gun offensive armament. Taking into consideration the fact that in the South American States, with the single exception of the Chilean Almirante Latorre, no vessel is armed with guns of larger calibre than 12-inch, these being of obsolete pattern, and further, that even though the solitary unit Almirante Latorre is armed with 14-inch guns, the present day 12-inch guns have practically the same range as the Almirante Latorre's 14-inch guns, and have twice the rapidity of fire; seeing also that her side protection consists of armour only 9 inches in thickness, the modern 12-inch gun would appear as suitable for the main armament, with the special merit of a considerable saving in weight and cost as compared with guns of larger calibre. The saving in weight—if triple mountings are adopted, and including the usual quantity of ammunition—is approximately 1,000 tons per triple mounting, where 12-inch are adopted in place of 16-inch, and 300 tons per triple mounting where 12-inch are adopted in place of 14-inch. In this respect it is interesting to note that the 16-inch guns only outrange the 12-inch by about 1,700 yards, whereas the 12-inch guns have the advantage of nearly double the rate of fire.

Notwithstanding the foregoing, the glamour of the 16-inch gun would undoubtedly appeal to the designer, and as, other things being



Design of Battleship Aircraft Carrier with 16-in. Guns.

Length, 750 ft.; displacement, 28,000 tons; speed, 26½ knots; armament, six 16-in., ten 4·7-in. H.A.; protection, 10-in. sides, 12-in. barbettes, 3-in. deck; aircraft equipment, 30 planes.



(*From a drawing by H. G. Swanwick.*)

BATTLESHIP AIRCRAFT CARRIER WITH SIX 16-INCH GUNS.

View of Flying-off and Landing Deck.

equal, six 16-inch guns, triple mounted, can be carried on a displacement not exceeding by more than 850 tons that necessary for nine 12-inch guns, triple mounted, without allowing for any increase in thickness of protection, I have taken the 16-inch gun as the main unit of the primary armament.

The secondary armament, as before mentioned, would consist only of anti-aircraft guns, but of such a calibre, viz. 4·7-inch, as to be at once capable of dealing with the auxiliary armament of most battleships or cruisers, whilst giving at the same time a very real protection against aircraft attack. The anti-aircraft installation is shown on the plan facing p. 80, and is so arranged as to offer no obstruction to the reception or flight of the planes. The sketch on the plate facing p. 84 shows the general appearance of this ship.

The number of guns, both primary and secondary, will be dealt with later when the other properties of the unit have been determined.

The question of a torpedo armament need, in my opinion, only be mentioned to be dismissed, as there is no record of any useful purpose having been served during the late war by torpedoes carried in capital ships, although of great importance in lesser units, whilst a considerable amount of useful space is taken up by such installations, in many cases the actual dimensions of vessels being increased to accommodate them.

Questions of Speed and Protection.

The next question of importance is that of speed. Here again, as in the case of the armament, we have more especially to consider possible opponents. Still confining the argument to the South American States as being the more likely to move first in the matter, the Chilean battleship Almirante Latorre is credited with a speed of 23 knots, the Moreno and Rivadavia of Argentina with 22½ knots, and the Minas Geraes and Sao Paulo, of Brazil, with 21½ knots. If one goes even further and takes the United States Navy into account, they have no capital ships with a speed exceeding 22 knots, so that a constant sea speed of 24 knots with ample boiler reserve would appear to meet the bill so far as the speed of possible opponents is concerned. Over and above this, however, is the question of the despatch of the aeroplanes, and for this purpose, in addition to the speed which the aeroplane may attain by its own motive power after running the length of the take-off deck, the vessel should have a speed which, added to that obtained independently by the aeroplane during its deck run, would ensure the despatch of the same without mishap. For this purpose it does not seem advisable to reduce the maximum speed of the vessel below 28 knots, although, of course, there are cases where such speed would need to be modified, depending on the length of the take-off deck and the maximum speed obtained by the plane at the moment of leaving the vessel.

In view of the foregoing it should be arranged that the vessel should be capable of maintaining a constant sea speed of 26½ knots, with a possible 28 knots for short periods when discharging planes.

The question of protection must also be based on possible opponents in action. The Almirante Latorre, with a 14-inch gun armament, has a maximum armoured side protection of 9 inches with 10-inch barbette protection, and armoured decks 2½ inches in thickness; the protection on the Minas Geraes and Sao Paulo being 9 inches, 9 inches, and 2 inches respectively, and that of the Moreno and Rivadavia a vertically tapering belt of a mean thickness of 9 inches, barbettes 9 inches, and armoured decks 3 inches.

Taking, therefore, the respective armaments and speeds into account, it would appear a reasonably safe proposition (when one considers that the resisting quality of present-day armour is infinitely superior to that of the vessels in question) to protect such new unit by main belt armour of not less than 9 inches in thickness, the barbettes by 9-inch armour, with horizontal deck protection 3 inches in thickness.

Had 12-inch guns been arranged for as the primary armament of the design in question, the above protection would have been decided upon as suitable, but the adoption of the 16-inch guns appears, naturally, to call for some increase in the defensive properties of the vessel in keeping with her more costly offensive equipment, and therefore the belt has been increased to 10 inches and the barbettes to 12 inches, the horizontal protection remaining at 3 inches.

I have already mentioned that the limitations imposed upon battleships and cruisers are such as to prevent the production of entirely satisfactory fighting units, and in no case does this apply more forcibly than in connection with armoured protection, the weight available for which is dependent on what remains from permitted tonnage per unit after providing for the hull, machinery, equipment, and armament weights.

It will be evident to all warship designers that any capital ship constructed within the Washington conditions, under the handicap of weight of armament, until recently undreamt of, together with provision against underwater attack by torpedoes or mines, must, of necessity, have either vertical protection comparatively thin if covering a large percentage of the total above-water side, as in pre-Washington Conference battleships, or, if the machinery and armament are to be adequately protected, a large percentage of the vessel's side must remain unarmoured, and the protection concentrated on vital parts.

The probability is that the latter form will be followed by those responsible for the design of any capital ship under the pact, and it will be a matter of intense interest to watch the decisions of the various countries concerned when dealing with this phase.

Mention might also be made here that the designs for the latest aircraft carriers allow for practically no armoured protection, these depending for their safety on high speed and anti-aircraft equipment.

In the battleship plane-carriers described later it will be seen that the planes are not protected, in this respect being comparable to the accepted arrangement of the ordinary aircraft carrier, but the whole of the vital parts of the vessels, including machinery and

(*From a drawing by H. G. Swanwick.*)

BATTLESHIP, AIRCRAFT CARRIER WITH 16-INCH GUNS.

Bow View.

armament, are protected by modern armour of substantial thickness, with horizontal protection of sufficient strength and scantling to afford reasonable protection from plunging shot or a chance bomb from aircraft, and as in this vessel the limit of the Washington Conference restriction is not reached it remains possible, if desired, to further increase the thickness of such protection or to extend its area, but this, of course, would be at the expense of part or the whole of the margin of 14,000 tons already referred to.

The total weight of protection includes that used for underwater purposes against torpedo or mine attack and is sufficient to cover any one of the alternative arrangements adopted by the various Powers since the war, some of them based on indeterminate experiments carried out to test their efficacy and others based on the theoretical conclusions of the designer.

The Aerial Equipment.

Finally, the extent of the plane equipment is to be considered. Putting aside the extravagant fancies of those who imagine that the plane-carrying capacity of a warship is unlimited, a vessel such as proposed would carry at least 30 planes of varying types and for varying purposes.

In order that a vessel embodying these features should not be hampered in carrying through the functions for which she is designed, it is necessary that ample length for all purposes should be provided.

The powerful primary armament of 16-inch guns is arranged in two triple turrets carried forward of the machinery spaces, occupying a considerable length of the upper deck.

Abaft this, and sufficiently high to allow the planes to be flown off over the turrets, is fitted a superstructure deck, which must have a fairly considerable length to provide the necessary run as a take-off. The after end of this deck is arranged for the reception of the landing or homing planes, which are either taken from this deck into their hangars by means of a lift, or run to their designed positions on the superstructure deck, as may be required.

From the foregoing it will be seen that the length of the vessel must, on account of the reception and despatch of the planes, be greater than would be necessary if the vessel simply retained the armament, protection, and speed already specified and was not intended for aircraft carrying.

The reception and flight of planes in this design, in accordance with present practice, take place on and from the superstructure deck. Other proposals have been considered for similar purposes, more especially for the reception of the planes after flight, one of which arranges for the after end of the vessel abaft the flying-off deck to curve down to the water line for the landing of homing planes, these to be run up by their own power from the water either into their hangars or their positions on the superstructure deck. An alternative proposal is to convey them into such positions by means of special escalators. Whilst such methods of reception

warrant careful investigation, they would, in my opinion, if applied to a vessel in any way approaching the length of the one under discussion prove a danger, so far as the manipulation of aircraft is concerned, for to land on an inclined plane often swept by heavy seas would be difficult and at times impossible, especially taking into account the constant movement of such inclined plane due to the rolling, pitching, and scending of the vessel.

This design differs considerably from the experimental battleship outlined in "Brassey's Naval Annual" of 1923, which went up to the limit of the Washington unit capital ship displacement, and was possessed of high speed and maximum protection. The protection in the unit under consideration has been modified to meet other more or less vital conditions

It will be noted that in the new type funnels have been entirely dispensed with, the products of combustion being carried overboard through water-swept ducts. As structures already exist on one side of the deck for fire control and navigation purposes, there is no reason, if preferred, why the funnels also should not be arranged on the deck and carried up on the same side as the navigation and fire-control structures, still leaving a comparatively clear deck for the planes, although such an arrangement would reduce and interfere with the effective placing of the anti-aircraft armament, and also have the defects of the smoke and the vibration of heat exhalation interfering with the sighting of the guns.

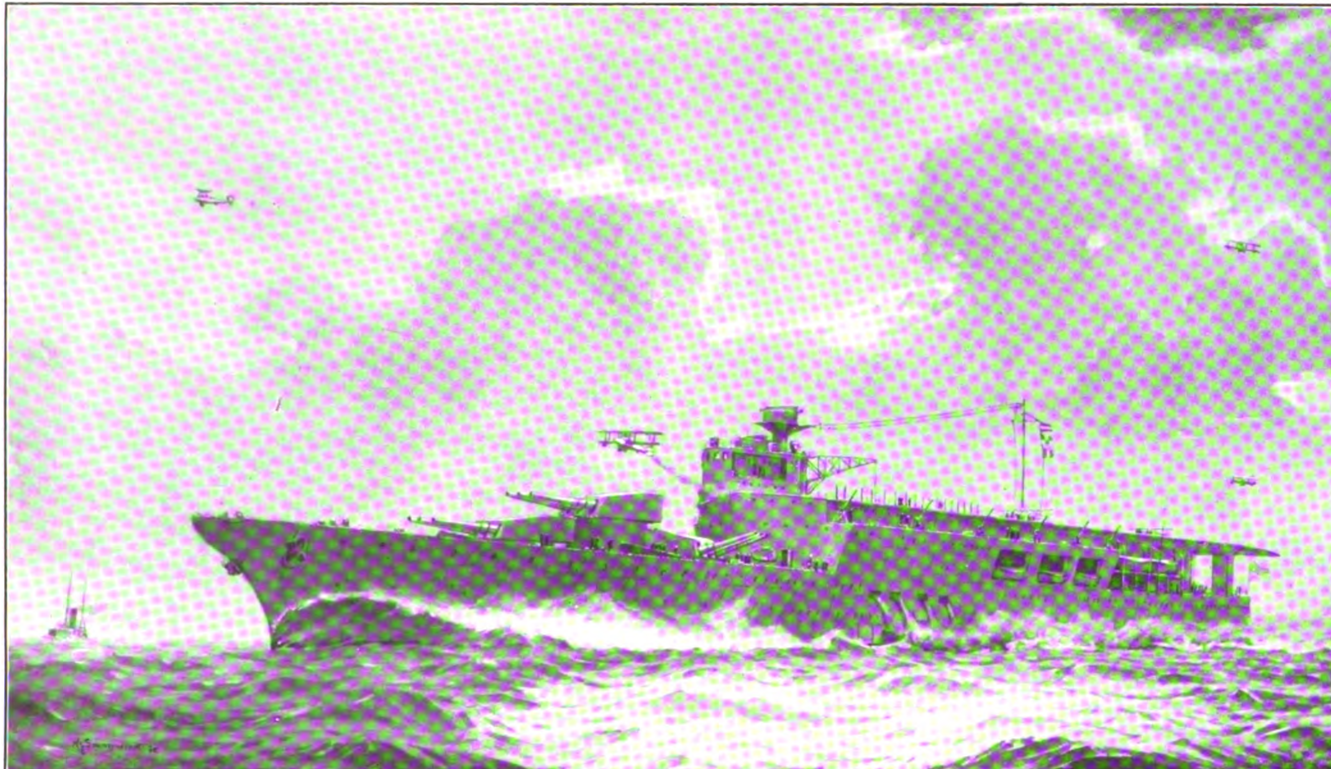
Dimensions of the Battleship Plane-Carrier.

As this contribution is not for the purpose of detailing the design of aircraft carriers or battleships, but simply to envisage the same as a whole, it will probably serve the present purpose if the general dimensions and characteristics only of the unit under discussion are given:

Length	750 feet.
Breadth	88 "
Draught	26 feet 3 inches.
Displacement . . .	28,000 tons.
Speed at sea in knots .	26½.
Primary armament . .	Six 16-inch guns, triple mounted.
Secondary armament .	Ten 4·7-inch anti-aircraft guns.
Aircraft equipment . .	30 Planes for scouting, bombing and torpedo dropping.
Torpedo equipment . .	Nil.
Protection	Armour on sides 10 inches; armour on gun positions 12 inches; armour on deck 3 inches.

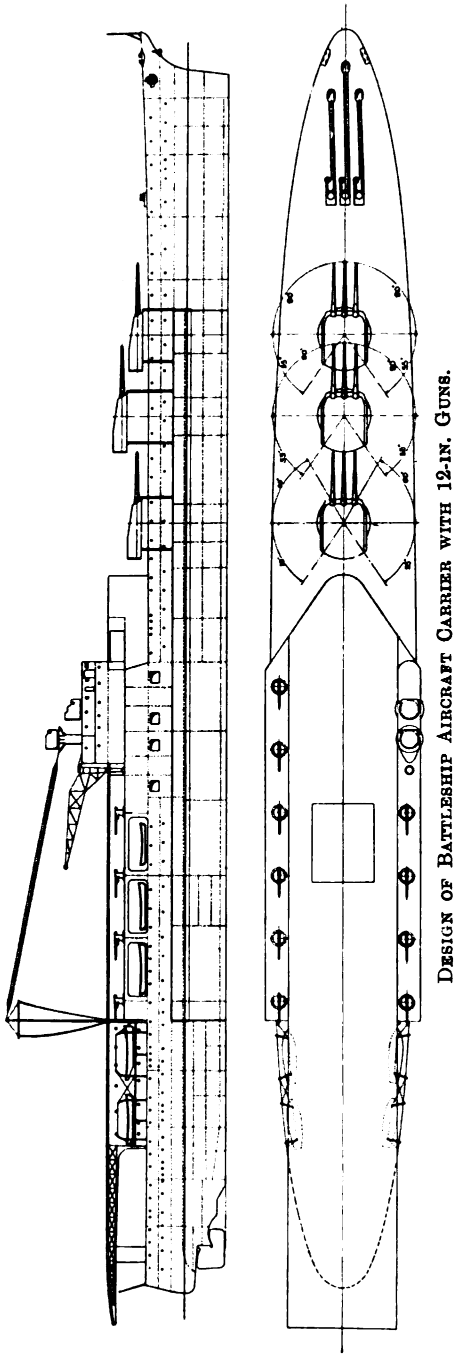
From the foregoing it is evident that a very powerful combined unit can be evolved possessing not only an offensive armament of serious import to any existing capital ship, but an aircraft equipment of sufficient strength and purpose to compensate for the non-provision of aircraft carriers as separate units for fleet work. Moreover, two such units can be constructed in place of two of the Conference type of capital ships, leaving a margin in hand for other purposes of 14,000 tons, and at possibly a smaller cost per ton.

A longitudinal section of the vessel proposed is given on the



(*From a drawing by H. G. Swanwick.*)

BATTLESHIP AIRCRAFT CARRIER WITH NINE 12-INCH GUNS,



Design of Battleship Aircraft Carrier with 12-in. Guns.

Length, 750 ft.; displacement, 26,850 tons; speed, 26¼ knots; armament, nine 12-in., ten 4·7-in. H.A.; Protection, 9-in. sides, 9-in. barbettes, 3-in. deck; aircraft equipment, 30 planes.

plate facing p. 80, and an illustration of the completed vessel at sea on the plate facing p. 84.

The general arrangement of the same vessel, fitted with nine 12-inch guns, triple mounted, is given on the plate facing p. 90, and an illustration of the completed vessel at sea on the plate facing p. 88.

Before leaving the examination of this type, it may be of interest to discuss the results on the displacement of fitting alternative primary armaments.

The substitution of nine 14-inch guns, triple mounted, with main belt armour 10 inches, barbettes 12 inches, and deck protection 3 inches in thickness, would mean an additional displacement per unit of 450 tons, whilst maintaining the same speed and other qualities.

The substitution of nine 12-inch guns, triple mounted, with main belt armour and barbettes 9 inches, and deck protection 3 inches in thickness, would mean a smaller displacement per unit by 1150 tons.

The substitution of six 14-inch guns, triple mounted, with main belt armour 10 inches, barbettes 12 inches, and deck protection 3 inches in thickness, gives a decrease of 1700 tons.

The substitution of nine 16-inch guns is, of course, impossible without entirely altering the character of the proposal.

The variations in displacement as given above allow not only for the changes in armament, but also for the difference due to change of dimensions, and the varying powers of the machinery necessary for the given speed.

Conservative Tendencies.

Space does not permit of an analysis in detail of the design proposed, but there is no question that a vessel of approximately the type and size shown could be constructed to carry out successfully the duties indicated. It is perhaps inevitable that a particular school of naval thought would be averse to approving anything of such a revolutionary character, so that, with the determination to maintain the aircraft carrier as a separate unit, financial limitations would lead to an endeavour to produce a type of capital ship which, whilst not so large or so expensive as the Washington type, could offer a strong opposition to the same in action.

Consider for the moment a type to meet such conditions. In the first place, the speed should be such as to allow the vessel to keep out of any engagement with possible enemies at the discretion of the high command, and so be able to choose the favourable moment for attack. In that case a speed of 26 knots would appear ample; she would require a main armament superior to possible opponents and capable, if necessary, of dealing with a Washington unit, which points to a reduced number of 16-inch guns: a reasonable secondary armament, say eight twin-mounted 6-inch guns, with at least six 4·7-inch anti-aircraft guns, no torpedo equipment, and possibly a

few scouting planes, with protection generally not inferior to that of the Washington unit.

The general arrangement of such vessel is shown on the plate facing p. 87, and a sketch of the same vessel at sea on the plate facing p. 92.

On a displacement of 26,500 tons two of such units with their greatly superior speed, together with an aircraft carrier of at least 17,000 tons displacement, could be built for the same displacement as two of the Washington type, and so would appeal to those Powers which, whilst desirous of adequate maritime protection, are prevented by financial reasons from equipping and maintaining a large fleet of Washington primary units.

The characteristics of such a vessel are as follows :—

Length	600 feet.
Breadth	92 „
Draught	28 feet 3 inches.
Displacement . . .	26,500 tons.
Speed at sea in knots .	26.
Primary armament . .	Six 16-inch guns, triple mounted.
Secondary armament .	Eight 6-inch guns, twin mounted; six 4·7-inch anti-aircraft guns.
Torpedo equipment .	Nil.
Protection	Generally not inferior to that of the Washington unit.

This brings us to the point where the all-important decision has to be made as to adoption of type, upon which choice the very life of a nation may depend. Such decision must of necessity be governed by local conditions of prospective war and finance, and even should the step be taken in the first place by one of the South American States, it will undoubtedly influence to a large extent the actions of European countries both within and outside the pact, possibly also our own Dominions and Colonies, I therefore look forward with interest to the first capital units and aircraft carriers constructed outside the contracting Powers' jurisdiction, to see whether these may prove to be close approximations to the capital units and aircraft carriers contemplated or now under construction by the contracting Powers, with their enormous first cost, or smaller and less costly capital units with the saving in tonnage allotted to aircraft carriers, or whether those most intimately concerned will have the courage and initiative to face boldly the situation and construct a capital unit serving both purposes—the battleship plane-carrier.

George Thurston.

CHAPTER VI.

The Peace Mission of the Navy.

History is consistent in its teaching that, following a great cataclysm such as the past war, a wave of national depression seizes the people of the combatants, victors and vanquished alike, and from the unstable mentality thus created there invariably arise insistent and frequently ill-considered and dangerous agitations for economic reform.

The necessity for wise economy is too patent to merit discussion—yet so uninformed is public opinion generally, and so little are the masses in touch with affairs outside their immediate surroundings, that one and all aim their most clamant demands at the very fighting services upon the efficiency of which success, and their safety, in international conflicts depends. There is no subject in regard to which a proper perspective is more needed than our naval strength.

The real question is, "Do we or do we not still need an efficient and sufficient Navy?" If the answer is an affirmative, then it is useless to quote the disappearance of the German Fleet, the impossibility of a war with America, or the absurdity (and danger!) of building against Japan, as reasons for curtailing, and even definitely stopping expenditure on the sea service. Those who advance these arguments have but little understanding of the true meaning of naval power to this realm, and its value as a factor in general world peace.

False Ideas of Economy.

Before approaching this subject in detail, and in order that no misunderstanding should arise as to the attitude of what may be termed the "pro-Navy" school, let me say this. The Navy, as with the Army and Air Force, became abnormally expanded during, and as the result of, the war; in all three services there has been, and still is, extravagance capable of correction or excision. Those who have held high administrative posts know only too well the fantastic opposition to be overcome when reduction of expenditure is sought in any Government Department. Each branch, each section is all for economy—but it must not start with them! Nor is it helpful when public men—I have in mind a colleague in the House of Commons—state on the open platform that in their belief £100,000,000 could be saved annually on the services alone. It

would be interesting to know how to maintain the three fighting forces on the remaining £26,000,000!

However much a platitude, one cannot too often repeat that where the Navy is concerned, the British Empire is placed far differently as compared with any other country. Our distant Dominions, scattered colonies and minor possessions, our practical dependence for food in the United Kingdom on overseas transport, are but a few of the features distinguishing us from the other nations of the world. Nor has the world war, in its results, lessened our responsibilities; yet with these notably augmented, we have of our own volition foregone under the Washington Convention the proud title we had held until then of "Mistress of the Seas." Such phrases as "The Two Power Standard" and "Two Keels to One" are already and definitely past history. This fact alone, momentous indeed as future historians will write, makes the consideration of our place in the naval world even more urgent and difficult.

The Fleet Wearing Out.

There are, too, factors on the material side requiring earnest thought. To-day, under the international agreement, our Navy is sufficient for all possible or probable eventualities. But having said so much, it must be remembered that in all classes of its units it is largely war-built in batches or groups—and in batches or groups the various classes will become, and are becoming, not only obsolete, but worn out. Comparatively few of the vessels now afloat were designed subsequent to the conclusion of the war—in the main, they were designed and built to meet the emergency of the moment and though excellent, as all British warships, in construction and workmanship, they do not incorporate the many valuable lessons based upon maturer consideration of war experience. As has truly been said, the problem of the immediate future is not the strengthening of the fleets at sea, but the re-building of the entire British Navy.

Individual cost is another vital factor in this question—the Nelson and Rodney, the only two capital ships under construction in the world to-day, will, on completion, have cost the State nearly £7,500,000 each. This is a prodigious total which no Exchequer in these days can afford, and it is quite possible, nay probable, that in these two vessels we shall see the last of a long line of ship-type, a line threatened through the years by divers lethal inventions to be exterminated in the end by crushing cost. After all, the capital ship is a name more than a type—if and when all the battleships and battle-cruisers of to-day are scrapped, then it is possible that the 10,000 ton cruisers now being built by the leading Naval Powers will become the capital ships of their era. And even they are costing individually more than the Dreadnought battleships of the Iron Duke class, immediate pre-war designs of 25,000 tons each. Since it is this question of cost which chiefly underlies the pernicious, uninformed, anti-Navy propaganda now so current, it were well, in the interests of the Navy itself, to see whether or not the agreements

accepted at Washington cannot be turned to our economic advantage without detriment to our naval position.

THE ".WASHINGTON CRUISER."

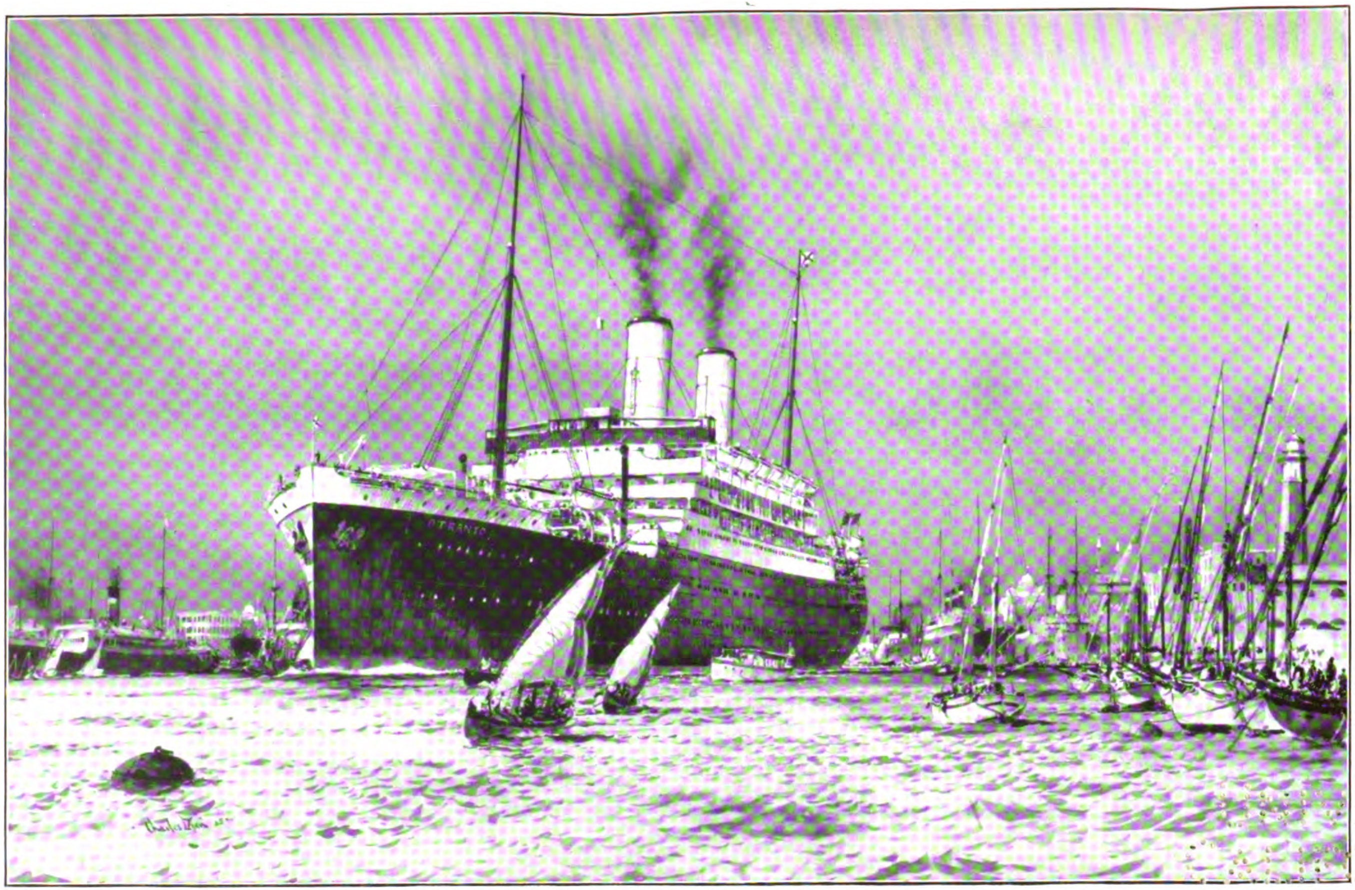
If no more battleships are to be built, and their mantle as the final arbiters in sea-warfare is to fall upon the largest vessel permitted to be built under the Washington Convention, it would surely be reasonable to suggest to any other International gathering called to consider reduction in armaments, that the limits in dimensions and calibre of guns should be re-considered. We are to build, as part of our replacement programme, a number of 8,000 ton cruisers; as an alternative it would harm no one, and maintain the *status quo*, if vessels of this size, to carry guns not exceeding 6 inches in calibre, and with speeds of not more than 33 knots were to be agreed as the maximum in future in place of the present accepted 10,000-ton type, of unlimited speed and mounting 8-inch guns. The price per unit would probably be reduced to £1,500,000 from the £2,250,000 or more that the larger design is now costing.

Surely with the above suggestions seriously advanced it cannot be claimed that because, in association with them, we demand a sufficient and efficient Navy, we are guilty of provoking a new race in naval armaments.

The establishment of peace upon a permanent basis is the aim of every responsible statesman, but no one imbued with even a superficial knowledge of foreign affairs and their present perplexity can seriously believe that the complete and simultaneous abolition of all armaments would accomplish this end. The recreation of States formerly great, the acceptance and absorption of new boundaries, the setting up of Governments and Constitutions either anew and upon novel lines (or else where no Government formerly existed), are in themselves adequate reasons against the belief that international armed strife is no longer possible. Perhaps the main question can be put thus: "Is the British Empire a greater factor for the maintenance of peace with or without a Navy?"

CEMENTING THE EMPIRE.

The value of Empire and world cruises such as undertaken by the Prince of Wales in magnificent naval units, or by special Service squadrons, will surely not be called in question. The moral effect not only upon the people of the countries visited, but also on the development of friendly relationship is not computable, whilst with our Dominions and Colonies the tangible strengthening of Empire ties that inevitably result is in itself full compensation for the cost entailed. I have had it suggested that a much smaller fleet could supply the necessary vessels for these voyages—"Joy-trips" as the super-ignorant delight to mis-name them—but to that surely the answer is patent. The people visited, and above all their Press, are not so grossly wanting in knowledge as to lack appreciation of



(From a drawing by Charles Dixon.)

T.S.S. OTRANTO FOR THE ORIENT LINE TO AUSTRALIA (ANDERSON, GREEN & CO., LTD.).

(Constructed by Vickers, Ltd., Barrow-in-Furness.)

the vital fact that the few units they see are representative in efficiency, type, and general value of the entire British Navy, a Navy co-equal with that of the United States. This co-equality is our rampart, for were we *inferior* the very effect of that knowledge would stultify the value of this showing of the flag. Half a necessary fleet is of less worth than no fleet at all, since it would not only be expensive, but useless should a conflict arise. From the Empire standpoint I have but to recall the many occasions when the presence of our ships has proved a needed backing to Dominion or Colonial administration and authority, whilst it invariably gives a feeling of security to natives or other racials under the British flag, who recognize in it the embodiment of just and beneficent rule. Cementing the bonds of Empire is surely no idle phrase, and the last to wish any reduction in, or the abolition of, our Navy would be the traders, pioneers or colonists to whom we look for the maintenance and development of our wide-flung possessions.

Policing the Seas.

Running parallel with this Imperial duty we have that of policing. Slave-trading would to-day still be a blot on civilization but for the Navy's effective work in its suppression, and it will surprise many to learn that much work is still necessarily carried on to keep it under control. Gun-running, piracy, and fishery protection are all problems within the sphere of naval influence—matters of world-wide importance dealt with effectively by the ubiquitous units of our fleet. Visits to outlying islands, far off the track of merchantmen; administrative difficulties of small possessions out of touch with authoritative influences; assistance urgently sought for shipwrecked crews or castaways—all these and many other duties are gladly undertaken by the fleet, the effective outcome of which would be reduced largely if it were known and accepted that the Navy were a declining and obsolescent force.

On the scientific side the British Navy may claim to have contributed a lion's share indeed to our modern depth of knowledge, its specialized branches have done more than any others to survey coasts and sound the ocean bottoms, whilst the amount of assistance rendered in scientific expeditions and to the essential features of astronomy and meteorology cannot adequately be estimated.

On the purely moral and civilizing side of the naval services, the constant visits here, there and everywhere, frequently unpremeditated, by isolated units of our distant squadrons, or by gunboats or survey ships, are matters of no little importance where our national standing is concerned. Those who have had an opportunity of studying individual units of our Navy and those of foreign countries cannot fail to have been struck by the smart, manly appearance of British crews, the rigid and yet unforced discipline of the general routine, the excellent behaviour and splendid demeanour of both officers and men when ashore. I cast no reflections on the efficiency of the vessels and *personnel* of other nations, but there is a certain

"something" that has ever made the visits of British men-o'-war a subject of deep appreciation and constant eulogistic praise, whatsoever the country or people visited.

Yes, our Navy has indeed a wide and valuable mission for peace, yet, when that is said and recognized, behind it all lies this—that by the Navy, under the good providence of God, was our Empire built up, and we, in our generation, are not prepared to permit this great heritage to slip from our grasp through the improvident economic fallacies of the unthinking and the ignorant.

ALAN H. BURGOYNE.

CHAPTER VII.

By-products of the Washington Conference.

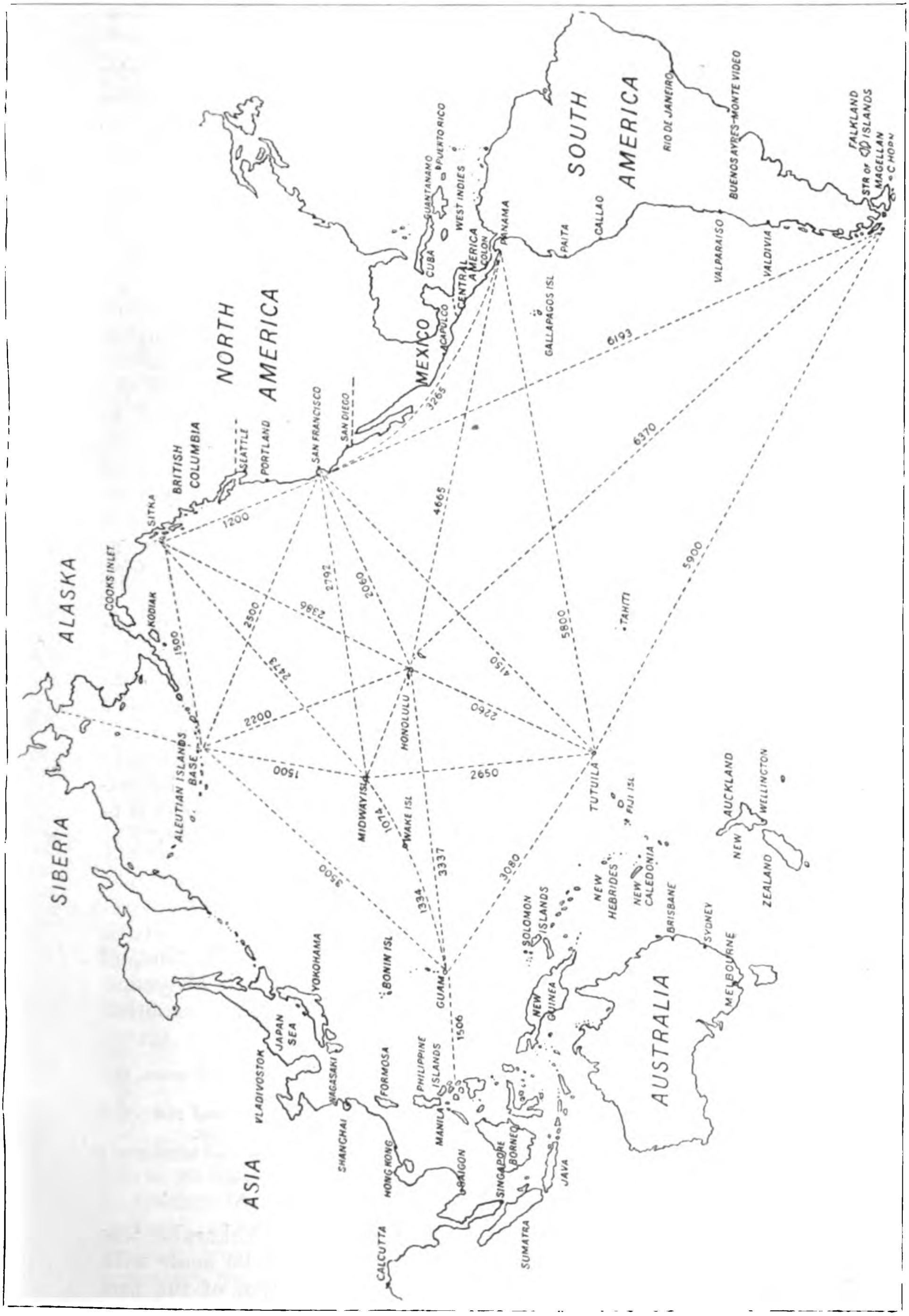
The unforeseen results of any international arrangements are always different and even greater than those actually intended, because, for one thing, psychological reactions are not always those anticipated, and because, for another, political reactions differ in the various countries owing to the exigencies of party politics. Under the Parliamentary system of government, the pendulum swings back and forth with changes in policies, in Prime Ministers, and in Cabinets. In the Washington Conference of the five leading Naval Powers, three of the Governments concerned, Great Britain, France, and Italy, have the Parliamentary form, and the other two, America and Japan, have the Presidential form; that is, the Cabinet is not dependent for its tenure of office on having a majority in either of the parliamentary bodies. Japan is, however, gradually approaching the Parliamentary form through the indirect means of bringing about Cabinet crises.

The Members of the Cabinet of the United States are personal appointees of the President and are only very indirectly amenable to the will of Congress. The President is his own Prime Minister, and thus there results such a definiteness and continuity in foreign and domestic policies as to make the Government very conservative as compared with European countries, in which the agreements made by existing Cabinets may shortly run counter to the policies of new ones and thus suffer reversal. Moreover, no treaty to which the United States is a party is binding until ratified by the U.S. Senate, while with the other four Powers, treaties are made by the Prime Minister and Foreign Office, their contents not being necessarily communicated to Parliament unless there is a financial obligation to be provided for in connection with the treaty. Secret treaties are possible in European and many other countries, but not in the United States, which country feels that, in European Conferences, the cards are not always on the table, and have sometimes been passed around under it. It is a curious fact that the Washington Pact practically involves the United States in an alliance (which is against her traditional policy), in that the five Powers agree to enforce the "Open Door Policy" in China. This is because the United States presumably intends to preserve it herself, whether or not political upheavals in the Governments of the other Powers make the policy distasteful to new Prime Ministers or Cabinets. The people of the United States do not take kindly to a system of

government by parliamentary *blocs*, as in most European countries, and prefer the two-party system of the " Ins " and " Outs," for it has resulted, historically, more than once, that one political party has purloined the other party's " platform " and literally used it as a raft on which to float into office. Bismarck, in the " eighties," robbed the Socialist party in Germany of its entire programme and sterilized that party by putting on the statute book of the Empire all of its employers' liability and old age pension schemes, which are just now the football of British political parties. It is an old trick and is not unknown in other countries. Sometimes even wars are brought about when all other political measures fail; but the Washington Conference sought to avoid wars by restricting the instruments of war. It was well intended, but it was a political compromise and needs further patching.

Relative Standing of the Powers.

In the first place, the World War eliminated Germany, Austria, and Russia as Naval Powers, at least for the present. France and Italy, having suspended the construction of battleships, were caught by the *status quo* provision of the Washington Conference, and France dropped to fourth place, while Italy now stands at fifth. Great Britain renounced her " Two Power " standard and accepted parity in battleship tonnage with the United States, but evidently has no intention whatever of renouncing primacy at sea, as she still sings *Rule Britannia* as vociferously as Germany hochs " *Deutschland über alles.*" As to Japan, she had seized Shantung during the war; captured the German stronghold of Tsingtau; occupied the German colonies in the Pacific north of the equator; strengthened her public finances; increased her shipping; extended her commerce; and established her ascendancy in the Far East. In 1920 she inaugurated the so-called 8 : 8 : 8 programme, designed to give her, in 1927, a squadron of 8 new battleships, a squadron of 8 battle-cruisers, and a third squadron of 8 pre-war battleships. In addition, there was a programme of cruisers, destroyers, submarines, and aircraft, and a progressive plan of sea-coast fortifications and naval bases from Saghalin on the north to the Bonin Islands, with a strong grip on the mandated islands, further south. The end of the war found the United States embarking on the construction of 16 powerful capital ships, each of 32,600 tons or over, all designed to carry 16-inch guns, and a vast merchant marine second only to Great Britain. This proposed expansion of the American and Japanese navies put the centre of gravity out of the European sphere and created a political tension in the Pacific which involved the British Dominions. The Washington Conference naturally followed, much to the relief of Great Britain. Six months before the invitation was issued in Washington, the First Lord of the Admiralty said, in Parliament, that he hoped the call for a conference would come from the United States.



Fortified Naval Bases in the Philippine Islands, Guam, Wake Island, Midway Island, Tutuila, and the Aleutian Islands, renounced by the United States in accordance with the Washington Treaty. Steaming Distances in the Pacific Ocean are indicated. (See pages 113–4.)

Limitations under the Treaty.

The Washington Conference was political, and that is why admiralties are having untold troubles in reconciling themselves to the anomaly of the battleship being the yard-stick used to measure naval power, while, at the same time, two of the Five Powers, France and Italy, had practically renounced the building of any more battleships, thus leaving them free to build as many of the ships they really wanted without any limitation as to the total tonnage. The ratio 5 : 5 : 3 was, therefore, an acceptance of the fact that in a naval way Great Britain now dominates Europe ; the United States, the Western Hemisphere ; and Japan, the Far East. Meanwhile most of the taxpayers concerned in the agreements of the Washington Conference believe that it abolished competition in naval armaments, whereas, while merely chloroforming the battleship, it pulled the throttle wide open for competition in everything else, except as regards (1) total aircraft-carrier tonnage ; (2) restricting the calibre of guns of auxiliary craft to 8-inch; and (3) the tonnage of individual auxiliary units to 10,000 tons ; (4) battleships may not carry guns of larger calibre than 16-inch, (5) nor merchant ships guns over 6-inch in calibre. This means that submarines and destroyers, as well as cruisers, may be increased to the limit of 10,000 tons as long as the armament does not exceed 8 ins. in calibre. The net result of all the agreements has been to confuse public opinion as to the relative values of weapons and types of ships, and has enabled experts with radical views, at least in America, to advance opinions as facts and honest beliefs as actual data, so that the calling of a second Conference, in the present muddled state of technical and public opinion, would be nothing short of an international calamity if the opinions of faddists were to prevail. Peace can only be predicated on national security, and no one is now sure of what constitutes naval efficiency, which is the best test of preparedness.

A Second Conference.

The idea of calling a second Conference, similar to that of Washington, seems to have been dropped, or is, at least, in abeyance. As gathered from newspaper sources it has in view, among other things, the following broad proposals :—

1. That the Naval Powers consider limiting, for a certain number of years, the total tonnage of other surface craft, such as cruisers and destroyers.
2. That submarines be abolished, or at least limited in numbers, and restricted in their use, especially against merchant vessels, in the most rigid manner.
3. That the Washington Treaty provisions limiting total tonnage and armaments of aircraft and aircraft carriers be extended.
4. That the development of naval aircraft be given a ratio.

The reaction in Japan, as announced by Admiral Takarabe, was that " the preparation for a second Conference must be made with much greater caution than was done on the occasion of the first Conference," and that unless there are " guarantees against disappointments, such as ensued after the Washington parley, an evil

atmosphere will necessarily develop that will certainly go far towards destroying the beneficial effects of the first parley." The Japanese Press has interpreted "guarantees against disappointments" to mean some sort of satisfaction or compensation for Singapore, and for Japanese exclusion by the United States, the usual *quid pro quo.* The French Navy is innoculated with the ideas of the "Jeune École," and France will never agree to any restrictions on submarines. On the other hand, Great Britain, for instance, would probably not accept equality in cruiser tonnage with the United States, on the ground that her very existence depends upon the protection of her seaborne commerce. The United States is very short of cruisers, and facing as she does on two great oceans, together with the Panama Canal and outlying possessions to protect, would probably not accept anything short of a 5 : 5 : 3 ratio in cruisers, because it was the fundamental principle of the Washington Conference proposals to establish that ratio. Great Britain also favours restricting submarines to the utmost. Italy is opposed to considering further limitations unless several other questions, including that of inter-allied debts, are considered at the same time. As to air disarmament, or restriction, it is generally felt that aviation is not entirely out of the experimental stage, and that it is too soon to clip its wings. In France, the abuse of the Washington Conference, from first to last, has been active and continuous from all quarters. The favourite words are "duped" and "tricked." Senator de Kerguézec, President of the Marine Committee of the French Senate, said very recently: "The Washington affair was, in short, an amicable dividing of world hegemony between America and Britain." As to any other Conference, he added that "France has not forgotten the costly lesson of the first Washington Conference; she objects to being duped twice." Altogether the people who speak best of the Washington Conference are not naval technical advisers, but statesmen who regard its political accomplishments as outweighing any technical considerations of national defence. The best way to bring about the second Conference is for the United States to build up to the limit of the 5 : 5 : 3 ratio in all types of ships in which a deficiency exists, and to scrap the tonnage in which the U.S. Navy is in excess. This would carry out the original proposals of the Conference and test the spirit of its subscribers. The fact is that the Conference did not allay international suspicion and distrust to the extent it had hoped.

Relative Value of Naval Weapons.

It is the function of naval vessels to transport the weapons of naval warfare and the *personnel* necessary to utilize those weapons in warfare to the fullest extent. The weapons are to-day the gun, torpedo, mine, depth charge, and aerial bomb. The gun is the primary weapon of battleships and cruisers, but it is imperatively necessary for all other types, including submarines and aeroplanes, also to carry it. This is what all the faddists overlook. Battleships and cruisers need not carry torpedoes (but they do). The torpedo

is essentially the weapon of surprise, and is carried by the destroyer, the submarine, and, under certain conditions, by aircraft, but they must also carry the gun. The primary weapon of aircraft is the aerial bomb, but the gun is the necessary defence against other aircraft.

The mine layer drops the mines which may be dangerous to all surface and under-water craft, but it also carries the gun as a protection against other craft; thus you cannot get away from the gun as the supreme weapon on account of its accuracy, of its penetrative power, and of the terrible explosive effect of its "aerial bomb," which its shell is when it drops out of the sky with much more deadly accuracy than the "hit or miss" projectiles of aircraft. It has been recognized for some years, with the increased ranges at which battles may be fought, that ships must be given greater protection against plunging fire. Sir Philip Watts recently said: "What we did not contemplate with the Dreadnought was that descending shell could penetrate our upper and main decks and fittings and travel a considerable distance before exploding. It was anticipated that the shock would cause the fuse to act and the shell to burst before reaching the protective deck. The delayed action fuse had not been contemplated." With the present status of the aerial bomb penetration is not anticipated, but armoured protection which will keep out projectiles should prove equally effective against such bombs. Gravity, which is the propellant of the aerial bomb, increases the velocity of the missile as it falls through the increasingly dense medium—the air. The currents of air tend to deflect it at right angles to its trajectory, and if the target is moving, it is increasingly difficult to estimate its trajectory, except empirically. As between the aerial bomb and the gun, at the same ranges and same target, accuracy is entirely in favour of the gun, as its trajectory can be reliably predicted and the result put on the sight bar. A bomb, dropped from the height of 12,000 feet, requires 28 seconds to reach the deck of a ship. A 21-knot ship moves nearly a thousand feet on her course while such a bomb is in flight, and if she zigzags, the difficulties of estimating the trajectory are tremendous. In the British Navy's experiments with the Agamemnon, in July, 1924, which simulated war conditions as nearly as possible, with the ship under way and its movements directed by radio, 114 bombs were dropped at a height varying between 5,000 and 12,000 feet, and not a single hit was made.

The Gun and Aerial Weapons.

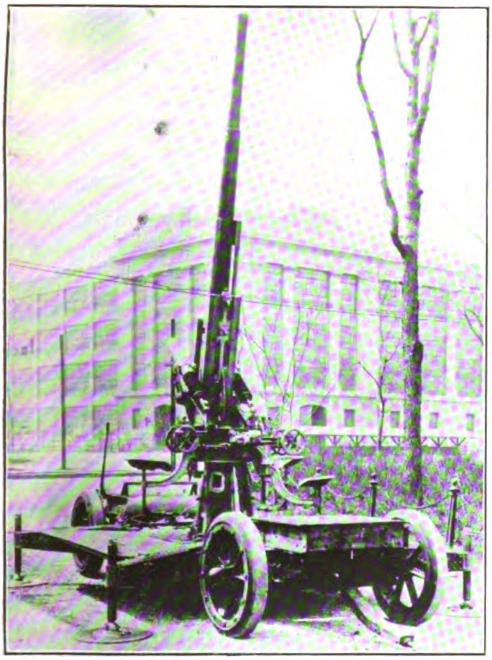
In other words, the gun fires an "aerial bomb" with much greater rapidity, much greater accuracy, and much greater penetrating power, than that dropped by aircraft, and even at a range of, let us say, 20,000 yards, a large calibre projectile descends on the target from an altitude of 3,800 feet. The offensive power of a fleet has unquestionably been increased and the range of its weapons extended by the offensive ability of the aeroplane to deliver bombs and torpedoes, beyond the extreme range of the fleet's guns

UNITED STATES 3″ ANTI-AIRCRAFT GUN.

The new Navy gun is similar in ballistics.

The gun and mount shown on this plate is a late design of anti-aircraft artillery. The movable carriage shown is for army service, but the same gun is to be used on a fixed mounting for new ships. To our readers interest is associated with the gun, its mounting and ballistics.

The gun fires a 15-lb. shell at a muzzle velocity of 2600 feet per second to a maximum range of approximately 17,800 yds. The breech mechanism is of the side sliding type, opened automatically on counter recoil. On loading the extractors are tripped by the cartridge case, and the breech block is closed by means of a spring. The trunnions are attached to the cradle near the breech of the gun, and the unbalanced tipping parts are counterpoised by means of pneumatic equilibrators. The elevating mechanism operated by the handwheels on the right side of the mount is of the worm and worm rack type, driven through bevel gears, and is designed to give two speeds. The high speed is 17 mils. per turn of handwheel, and the low speed $7\frac{1}{2}$ mils. per turn. The traversing mechanism operated by the handwheels shown on the left side of the mount is also provided with two speeds, the high speed being 30 mils. per turn, and the low speed 13 mils. per turn. A quick release mechanism is also provided to afford ready means for traversing the mount through wide angles.



Final levelling of the mount is accomplished by means of four ratchet wrenches, the handles of two being shown on the photograph. These wrenches operate on screws at right angles on the base of the pedestal, which rock the pedestal about a spherical seat in the top thereof. The gun is equipped with a loading tray and a fuze setter built into the cradle. After placing the round in the loading tray, the fuze setter is slipped back over the time fuze, the fuze is set, the loading tray is rotated to bring the round in line with the chamber, and the round is then rammed by a hand-operated device built into the loading tray. This arrangement reduces the time lapse between setting of the fuze and firing of the gun to the minimum.

and torpedoes, because aeroplanes can carry and drop their bombs and torpedoes far beyond these ranges. The success of their operations is dependent, however, largely on the defensive means taken to prevent them from doing so. The value of the torpedo plane lies chiefly in the great speed with which the attack is made, but in delivering this attack the planes must descend to within 25 or 30 feet of the water, thereby increasing the risk of its destruction. Moreover, the aeroplane can protect surface ships efficaciously against their worst enemies, viz. submarines and torpedo craft of all descriptions, while controlling the fire of the big guns and thereby rendering the battleships more efficient. Through the co-operation of battleships, seaplanes, and submarines for attack and against being attacked, the battleships, through their new allies, actually become more important than ever. This leaves out altogether the anti-aircraft defence battery of the surface ships themselves. The 3-inch anti-aircraft gun fires a 15-lb. explosive projectile to a height of 24,000 feet and has a horizontal range of 17,000 yards. The Special Naval Board, recently assembled in Washington, says :

> The new 5-inch anti-aircraft gun fires projectiles weighing 50 lbs. to a height of 28,500 feet at the rate of 14 shots per minute, so that a battery of eight of them will deliver 112 shots at an airplane attack every minute, or nearly two per second. These guns are supplemented by numerous machine guns, each firing 400 half-inch projectiles per minute to a height of 8,000 feet. . . . There has been sufficient target practice at towed aerial targets in the fleet to enable us to form a fairly correct estimate of the chances of hitting an aeroplane with our larger anti-aircraft guns. The target consists of a sleeve of some suitable fabric, 14 feet in length with a diameter of 54 inches at its forward end, tapering to 44 inches. This presents a projected target-area of about 50 square feet, much less of course than any presentation that a bombing plane could afford. The height of the target is about 4,500 feet, and it shares all the movements of the plane that tows it. The target records show that in not less than 75 per cent. of these practices the target is struck with one or more shell fragments and often is shot away entirely. It has been held by many that the best defensive against aircraft is other aircraft, but the Board believes that in defending a battleship against aircraft, the anti-aircraft gun, which is always ready for use, probably holds first place, and as it improves in design and skill in use, it will in the end be found quite efficient to ensure reasonable security to a ship against bombing attacks.

It is an amusing fact that this finding of the Special Board has particularly infuriated the aviation faddists who want to abolish the battleship, and any one who holds such views is called an "ostrich," because that bird is assumed to bury its head in the sand and not see its pursuers, which is really not true of the ostrich. Moreover, its distinguishing characteristic is that of swallowing anything, which shows that the name is poorly chosen. Abuse is not an argument anyway.

Values of Types of Ships.

This is not a question to be dismissed in a few lines. The mission of any country's naval forces in time of war is to gain control of the sea ; to deny such control to the enemy ; and to exercise this control by destroying or demoralizing the enemy's sea communications; by blockading his naval forces, thus preventing raids; by fostering one's own sea-borne trade with neutral or with one's own colonies; by transporting troops to reinforce one's distant possessions or to undertake military operations overseas, and by repulsing the enemy's

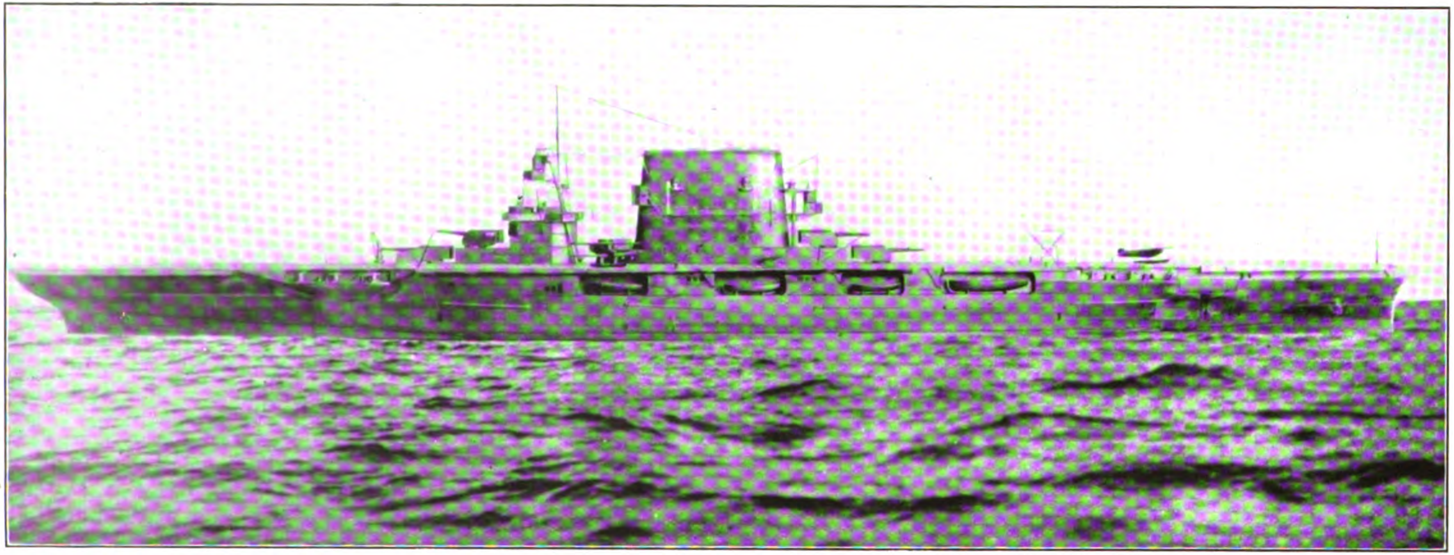
similar attempts. Most countries are dependent upon outside supplies, and a control force must not only deviate or destroy the ships which are carrying supplies to the enemy, but must in every way exert pressure on the enemy to strangle his sea activity. This control of the sea is carried out by cruisers, aircraft carriers, submarines, destroyers, mine layers, and patrol vessels. Formerly, battleships of the older types were the backbone of a control force, but since the Washington Conference scrapped surplus battleship tonnage, it is the mission of the cruiser to perform this service. Besides this control force, which is merely a minor group, the Battle Fleet must have first sought out and defeated, or else held in check, the enemy's main fighting force, and as defined by the Special Board of the U.S. Navy,

It should comprise battleships, light cruisers, destroyers and destroyer leaders, submarines and aircraft carriers. The Scouting Fleet is designed to search for and locate the enemy. Before battle it should concentrate on the Battle Fleet, and assist that unit in action. It should be composed of battle-cruisers, aircraft carriers, destroyer and destroyer leaders and submarines. . . . The Fleet Base Force comprises in general the Fleet Train of such combatant vessels as may be assigned to guard it and the advanced base from which it operates. The Fleet Train consists of the various auxiliary vessels needed to supply and serve the U.S. Fleet in the area of operations.

We have seen that all types of ships and aircraft which we may enumerate carry guns, viz. battleship, battle-cruiser (the U.S. Navy has none), the light cruiser, the destroyer, the destroyer leader (the U.S. Navy has none), the submarine, the mine layer, the submarine chaser, the patrol boat, the motor plane, the aircraft carrier with its planes, the flying boat, the airship and other naval aircraft, as well as auxiliary types, such as aircraft, submarine and destroyer tenders, repair ships, transports, hospital ships, supply ships, fuel ships, ammunition ships, distilling ships, tugs, despatch vessels, etc. The battleship, as the capital ship, was paid the compliment of being the yard-stick of the Washington Conference to measure naval power, but it paid for it by being restricted; but whenever the aerial bomb becomes a greater danger to a capital ship than gunfire, it merely implies that it is high time to provide adequate protection to meet the danger, but not to abolish the capital ship. Even if all countries agreed to abolish the battleship and battle-cruiser, any other type which carries the largest gun afloat will automatically constitute itself the capital ship, and we shall be merely lifting ourselves by our boot straps. As the Special Board says:

The great bulk of the world's commerce will continue to be carried on the surface of the sea. It will still be necessary to control sea communication. Aircraft alone cannot do this. Neither can sub-surface craft. Armed surface ships must still be used. It is inconceivable that a powerful and thoroughly reliable weapon like the gun will be scrapped. Therefore, the retention of such weapon in warfare, aided by the demands of strategy, will result in a battleship of the future, which, so far as can now be foreseen, will at most be a modification of the existing type.

Unfortunately the Nelson and the Rodney may set the pace for new battleship development just as did the Dreadnought in her day. Great Britain does not desire naval competition, but this will be the inevitable result from the inauguration of a new type of battleship-aircraft carrier.



U.S. ELECTRICALLY-PROPELLED NAVAL AIRCRAFT CARRIER SARATOGA.
(Constructed by the Bethlehem Shipbuilding Corporation, Fore River, U.S.A.)

AIRCRAFT *v.* BATTLESHIP.

If mere words could sink battleships, then all existing ones would have been annihilated by the recent verbal bombing in Washington. It went much further than did the attacks of the late Sir Percy Scott, because he believed that the British Navy would do better to put its money in aircraft and submarines than in any more battleships, for he personally told the writer several times, in 1920, that if he were an officer of the U.S. Navy, he would go in for battleships in view of the then existing political and strategic conditions. The tests made on the hull of the battleship Washington are the only ones on which to base data with safety, because the construction of her hull embodied all experience up to date. It is true that she did not have a crew aboard to plug leaks or to start the pumps going as would have been the case in actual warfare, but the effect of each blast on the hull of the ship was inspected and recorded and the accumulated effect was noted without any repairs between times. After each of the five tests which were made, the members of the Board were able to get to the inner bottom of the ship and make all the inspections necessary or desired. After subsequently riding out a gale of wind for three days, the ship could have been towed into port, but was instead subjected to further tests.

The five tests of the first day consisted in exploding bombs alongside of her in order to get the depth charge effect. Two 2,000-lb. bombs were exploded close enough to throw tons of water on board. Two tests followed representing the explosion of a modern torpedo war head of 400-lbs. at a distance of 13 feet below the water line in contact with the outer hull, and the fifth test was that of exploding a 2,000-lb. depth bomb to ascertain the further " depth charge " effect. The Board estimated that the ship could have survived the explosion in her hull of 8 torpedoes, if distributed about the under-water body. After the gale, a 14-inch shell, weighing 1,440 lbs., was dropped on her thick armoured deck from a height of 4,000 feet, point downwards, without penetration ; in doing which one airplane made eight attempts and failed to hit, but a second one succeeded in hitting on the fourth trial. The Washington was finally sunk four days after the tests began by 14 hits of 14-inch projectiles fired at oblique impact to obtain data as to penetration of armour, and she sank $2\frac{3}{4}$ hours after the time of opening gunfire. These results were similar to those obtained by the British Monarch tests, which, as far as given out, was first bombed by airplanes, then shelled by light cruisers with 6-inch guns, and finally sent to the bottom by salvos from the capital ships of the Atlantic fleet, including the Hood, the final salvo being 15-inch guns at a range of ten miles.

It is not necessary to discredit the gun and all surface craft in order to advance the claims of aviation to the lion's share of the naval budget, but the recent agitation in the United States has at least been productive of a much needed awakening of interest in aviation, however little credit it has reflected on those who have made reckless claims in order to discredit other weapons. The mine

and the torpedo are increasing in deadliness, and surface craft are rendered therefore more liable to unexpected attacks from the air and under the sea. Such attacks, once exceptional, will become the commonplace of naval warfare. Nevertheless, *the range and weight of gun projectiles remain the determining factors in war*, even if it shows one to be an "ostrich" by daring to say so.

The Washington Conference Cruiser.

It is interesting to see what the unforeseen results of the cruiser limitation have been. Of the British County class of five cruisers the utmost secrecy prevails. The Japanese Nachi class of four ships carries twelve 8-inch 50 calibre guns and 12 torpedo tubes; * has 33·5 knots speed; radius at 15 knots 14,000 miles; triple hull; vertical and deck protection over boiler and machinery spaces; and carries 4 seaplanes. The Italian Trento class of four ships carries eight 8-inch 50 calibre guns; twelve 4-inch 46 calibre A.A. guns; 8 torpedo tubes in four pairs; has 34 knots speed; and will carry two scouting seaplanes equipped for bombing. The French Tourville class of six ships will carry eight 8-inch guns; 6 torpedo tubes; 33 knots speed; a radius of action at 15 knots of 4,500 miles; and carries 4 scouting seaplanes launched with catapults. The tentative design of the United States cruiser of this type shows an armament of twelve 8-inch guns in triple mountings and carrying four seaplanes, with corresponding sacrifices in other respects. With the number of capital ships limited, and their casualties not easily replaced in time of war, cruisers will be used to force a decision. Their lack of armoured protection and the inability of the naval designers to subdivide the smaller hull as much as desirable, points to a new development of the larger armoured cruiser type charged to the allowance of battleship tonnage. There is this always to be borne in mind in considering any programme of modern light cruiser construction, and that is that those designed and being built now are strikingly superior to those designed a few years ago. Fifteen years is really the life of a cruiser, and a large portion of those borne on the lists of most navies are obsolescent. Fortunate is the country that has not many old cruisers on hand and that can build the newer type.

The Destroyer of To-day.

The U.S. Navy, from 1916–1922, added to its list 275 destroyers, of approximately 1,200 tons displacement, of 35 knots speed, with four triple 21-inch torpedo tubes, all of the same flush deck type and undistinguishable from each other, except by the numbers on their bows. These destroyers have only been excelled in very recent design by increasing the tonnage, but not in respect to number of torpedo tubes. The Japanese destroyers of 1,345 and 1,400 tons have greater horse-power and heavier guns, but inferior torpedo

* According to the Tokio correspondent of the *Times*, writing in May, 1925, the provision of so powerful an armament on the limited displacement is repudiated in Japan.

UNITED STATES 4000-LB. BOMB.

The Chief of the Army Air Service has proposed to double the weight of the bomb as a means of turning the scale the other way; that is, to drop bombs weighing 4000 lbs. instead of the heaviest practical ones of to-day, namely those of 2000 lbs. weight. This proposed solution of the difficulty requires analysis. As a matter of established fact, doubling the explosive charge only increases its pressure effect by 40 per cent. instead of 100 per cent., as might be supposed. Moreover, the bombers of to-day, using a supercharger, can attain a ceiling of only 8000 feet when carrying a 2000-lb. bomb. If the bomb is doubled in weight, the maximum ceiling or height attainable must again be reduced to one in which the bomber is very apt to come to grief from anti-aircraft fire. The total weight of bombs plus gasoline that can be carried by the bomber amounts to 4000 lbs., and any increase of the weight of the bomb above 2000 lbs. must reduce the amount of petrol that can be carried by the amount of such increase. If the increase is material in amount, the radius of the bomber, already meagre, will be curtailed to such an extent as seriously to hamper its activities. In order to avoid this contingency, the bomber must be entirely remodelled to a larger scale. This is a new and big problem, a solution of which may or may not be found.

equipment. Even the recent additions of 8 destroyers of 1,900 tons displacement, and 25 destroyers of much larger tonnage (said to be 3,000 tons) carrying 5·5-inch guns, are inferior in torpedo equipment. These last named are, in fact, light cruisers, as their cruising radius is 5,000 miles. Some of them, if fitted as minelayers, would answer all the requirements of the cruiser type of minelayer. The British minelayer Adventure carries 400 mines, and it is presumed that these Japanese flotilla leaders could carry 240. Meanwhile the French destroyers of the Simoun type displace 1,450 tons, and the newer ones of the same series, 1,700, and have about 35 knots speed, 5·1-inch guns, and six 22-inch torpedo tubes. The destroyer leaders of the Chacal type are really scouts, of 2,400 tons displacement, 36 knots, and six 5·1-inch or five 5·6-inch guns. The tonnage of all destroyers is steadily increasing up to the former flotilla leader class, and that class towards the light cruiser. The United States is not building the leader type, and is compromising the question by using light cruisers of the Omaha class as flagships of the torpedo flotillas.

The Submarine of To-day.

The pendulum has swung back and forth as to the value of the submarine in naval warfare. As a new weapon, it was about to revolutionise naval warfare, just as aviation is said to be about to do it now. Then, at the end of the World War, the depth charge, listening device, the bulge on ships, and the aeroplanes, seemed to have given it a definite set-back. The Washington Conference limitation of guns to 8-inch would seem to put the British M class of submarines out of commission, as they carry 12-inch guns, and to limit the tonnage of submarines to 10,000 tons under the strict interpretation of the Treaty, since they would then be cruisers. The submarine cruiser may do great damage to commerce, but it is only by almost ceasing to be a submarine. As a matter of fact, the submarine, as appreciated in the U.S. Navy, is more than ever a valued adjunct of the fleet, while its abilities for independent action, individual initiative and self-reliance are also recognized. As an adjunct of the fleet, it assists in gaining and maintaining control of the sea ; in coast defence ; in scouting prior to fleet action ; and in an offensive rôle during fleet action. Also as adjuncts of the fleet, a few submarines are fitted as minelayers instead of carrying torpedoes. As an individual unit the submarine's great value, as compared with surface and aircraft, lies in that (1) her initial cost is much less ; (2) her weapons require no sacrifice of radius of action ; (3) she can remain longer in the enemy area by submerging and conserving her radius of action ; (4) she is a scout and can also keep her offensive going day and night ; and (5) she can, by clever tactics, evade attack. The enemy submarine, by still-hunting, is its worst enemy, which means also that it is the best protection against the enemy submarine. A German naval designer estimates that one submarine can sink a modern battleship if it can fire all of its torpedoes into the enemy's hull, whereas it will require a squadron of at least sixty bombing planes to sink the work. The submarine reaches its best results

when it co-operates with the other arms of the service. The aeroplane, from its height, can see the enemy and direct the submarine where to seek its prey. It is estimated roughly that, at the present moment, the United States has 120 submarines under 10 years old; Great Britain, about 63; Japan, 51; Italy, 43; and France, 53. By 1929 France will have 2 submarine cruisers, 6 minelayers, 51 first-class and 12 second-class submarines, all of the latest class, just as Japan will have a considerably increased number, also all modern. It is felt that no international conference will agree to limit submarines on the present basis.

Building Programmes.

Great Britain's modest programme now under construction, the two battleships, Nelson and Rodney, and seven cruisers of the County class, has been dictated by reasons of drastic economy and, presumably, not through renunciation of dominant sea power. Partial and temporary limitations are accepted, presumably, in order to retrieve that financial position in the world which has always been one of her most powerful military assets. Speed in capital ships; cruisers for scouting and commerce protection; aircraft for commerce protection, for fleet reconnaissance, and for anti-aircraft defence; destroyers for fleet and commerce protection; cruiser submarines for reconnaissance and commerce protection; coastal motor-boats; patrol boats; torpedo-planes; minelayers and mine-sweepers for coastal and harbour protection, seem to be the outstanding features of Great Britain's naval policy. She leads in aircraft carriers both in numbers and design. When the Courageous and Glorious (now under reconstruction) join the fleet, the British Navy will have eight aircraft carriers with a capacity of nearly 400 planes. The Hermes is the only one strictly designed and built as an aircraft carrier, the rest being converted from other types. Her displacement is about 10,000 tons and she represents the smallest possible effective type. She, in fact, does not come under the limit of displacement prescribed by the Treaty.

Japan wants security of ocean trade routes, especially with the Asiatic continent, from which she must draw food supplies and raw materials. The Washington Conference cut her capital ship tonnage down to ten vessels, of which four are battle-cruisers of the older type and not qualified to "lie in the line." This disadvantage has led her, naturally, to seek protection through an extensive programme of cruiser, destroyer, submarine, and aircraft construction. She has an excellent series of defence bases in the northern part of the Western Pacific, and these need a large auxiliary combatant force for their protection and support. She has recently acquired an oil concession in Saghalin from Russia. Her naval policy is purely defensive, and her chief need is an outlet for her surplus population. Her naval air force is separate from that of her Army and is credited with remarkably few casualties in aviation, in which she is said to be showing great activity, while intending practically to double

the number of her submarines. Altogether her naval policy is dictated by her insular position and as the dominant Power in the Far East.

French and Italian Plans.

The two schools in France in favour of and opposed to battleship construction have the common ground that, under the circumstances, the financial condition of the country is such as to postpone the question until 1932, when replacement in battleships can be made. The loss of the battleship France reduced the existing battleship tonnage to 165,000 tons, whereas the French are allowed by the Washington Conference 177,800 tons of capital ships. With those in favour of battleship construction, the discussion rages as between battle-cruisers, small or large battleships and smaller battle-cruisers from 11,700 tons, 35 knots, and 9·4-inch guns upwards. The naval air service is dependent on that of the French Army, and aside from strictly scouting, "spotting," and fleet defence purposes, the Army air service is looked to for the air defence of the coastal and naval bases. In general, the French naval policy is entirely subservient to that of the Army, which is the real defence of France. Even as to the safety of communication with North Africa, it is for the reinforcement and supply of the Army that the route must be kept open. As a distinguished American Admiral says:

> All the fleets in the world may meet in battle and destroy each other and the result be as nothing if the battle does not change what was happening or was to happen on land. In other words, the Navy is important solely because it does influence events on land. Naval strategy always has an objective related to land operations, be they the operations of peace or war. Whatever the effect of naval strategy may be, it is the effect on those who live on or operate upon the land that counts. Naval strategy deals with sea methods, but finds its reward in land success.

France got from Germany the cruisers Colmar, Metz, Mulhouse, and Strasburg, 8 destroyers and 18 submarines, and from Austria the Thionville. Her twenty years' building programme calls for a total tonnage in each class as follows:—

Metric tons.	Class of construction.
177,800	Capital ships.
360,000	Light cruisers, flotilla leaders, auxiliary ships and destroyers.
65,600	Submarines.
60,960	Seaplane carriers.

Of the first instalment of this programme, there will shortly join the fleet, as a result of the 1922 law, the three cruisers, Duguay-Trouin, Lamotte Piquet, and the Primauguet, of 8,000 tons displacement and 35 knots speed; a seaplane carrier; 6 flotilla leaders of the Chacal type of 2,400 tons displacement and 36 knots speed, 12 destroyers of the Simoun type of 1,430 tons and 35 knots speed; 21 submarines, and 1 gunboat. A small part of the second section of the programme (1924) has been laid down, consisting of 2 cruisers, the Tourville, building at Lorient, and the Duquesne, building at Brest, of 10,000 tons and 35 knots speed; 6 destroyer leaders, and 2 submarines. The third instalment, up to 1928, is

for four 10,000 ton cruisers, 15 destroyer leaders, 18 destroyers, 2 submarines of 3,000 tons, 28 submarines of 1,500 tons, 6 submarine minelayers, 4 fuel ships, a submarine tender and a seaplane carrier. Conscription in the French Navy has always been accompanied by voluntary enlistment to keep up the 50,000 men required, but voluntary enlistments have been steadily on the decline for years past and recourse was had, in 1924, to drawing upon the Army recruiting depôts to the extent of 10,000 men. Improvements in pay and in service conditions, accompanied by propaganda, are improving conditions in this respect.

Italy believes that the command of the Mediterranean will not go to the Power with the most capital ships, but to the one which has superiority in small high-speed surface craft, submarines and aircraft. Her pre-war battleships have been reconstructed, as have been her pre-war cruisers, together with five which she got from Germany and Austria, and the latter are now being supplemented by a four years' programme of 5 light cruisers, 20 destroyers, and 20 submarines, of which four 10,000 ton cruisers, 8 submarines, and 8 destroyers are in hand. There is now completing a previous programme of 3 scouts or flotilla leaders (Tiger, Panther, and Lion), 8 minelayers, 9 minesweepers, 2 light transports and a number of combatant surface craft, gunboats, patrol vessels, and auxiliaries. In the next two years will be laid down the remaining cruiser, 12 destroyers, and 12 submarines of the four-year programme. Her present policy is to make all possible sacrifices on behalf of aviation, but without neglecting light surface craft, for which "mosquito bases" are now being provided. Therefore she is building 2,000 seaplanes, which will be in service by January, 1926. The recent consolidation of the national defence under one portfolio in the cabinet does not *per se* make for naval efficiency, but may result in better unity of command in time of war, especially in consideration of the geographical position of Italy, the Navy and sea coast defences preventing invasion by sea and the Army by land from the north, the Navy meanwhile keeping open her sea communications. As to *personnel* of excellent quality, the Italian Navy has no serious trouble in recruiting the full strength allowed, as their problem of surplus population is a real one.

American Construction.

Under the new budget system, the Navy Department finds that its programme of new construction has to run the gauntlet, with successive prunings. Even when Congress has accepted part of a programme, it has failed to appropriate funds to commence construction. With the result that it is difficult to say what is the present policy, as complicated by "political jockeying" for position. Out of the Department's proposals of cruisers, gunboats, destroyers, submarines, fleet submarines, minelayers, minesweepers, tenders and auxiliaries, and of the partial programmes authorized by Congress, the last session of Congress appropriated money for two 10,000 ton cruisers and six gunboats out of eight of each previously

authorized. The next Congress will be asked for money to lay down four additional cruisers, two gunboats, three fleet submarines, and probably to start work on the plans of the two battleships for replacement in 1932, under the Washington Treaty. Of the two airplane carriers, Lexington and Saratoga, for which the funds have been already provided, the Saratoga has been launched and is due for her trials July 1, 1926. While each of these ships is said to carry 72 seaplanes, 174 are being asked for them, at an estimated cost of $5,917,500 or $34,000 per plane. With the addition of the aeroplanes now under construction, as provided in the budget of 1925–26, and excluding those for the two aeroplane carriers above, the U.S. Navy will have 212 new seaplanes. In possibly one respect the U.S. Navy excels all others, and that is in the constant operation of these seaplanes as adjuncts of the fleet as much in conjunction with tenders as with carriers. It is felt that the next step in aircraft development will be in combining heavier and lighter than air machines, with the advantages of both types. It is a peculiarity of progress that the greater the efficiency of *matériel*, the more numerous must be the *personnel* attached directly or indirectly to serve it. Aviation, for instance, is making such demands on the *personnel* as to require large additions to that authorized by Congress. Being already short of officers, one half of the class of midshipmen to graduate from the Naval Academy in 1926 were kept out of the summer cruise to take up aviation, and the other half, after graduation, will be required to qualify in the summer of 1926. It is the same with the submarines. Like flyers, they are required to take a special physical examination, as their duties make as great a demand upon them as pilots for seaplanes, and a special course at the submarine school now lasts twenty-four weeks. Nor does this mean entire specialization in such duties, as duty on surface craft is the prime requisite. Practically no officer is now promoted to captain who has not done duty as executive, navigator, engineer, and gunnery officer. Whether aviation or submarine service will be regarded as a substitute remains to be determined. Specialization is encouraged for duty on shore, but even this is often ignored.

The Washington Treaty Ratio.

The ratio 5 : 5 : 3 : 1·75 of mere battleship and aircraft carrier tonnage represents in no sense a comparative strength of the navies of signatory Powers, because it does not take into consideration *personnel* and strategically located and well-equipped naval bases, which add so greatly to the sea power of a nation. Nor does it take into consideration the merchant marine on which to draw in time of peace and war. The chart on page 101 shows what the United States renounced in the Pacific in the way of fortified naval bases in the Philippines, Guam, Wake and Midway Islands, Tutuila (Samoa) and the Aleutian Islands. The United States is, and should be, prepared to go to great lengths to satisfy any legitimate anxieties of Japan as to any hostile intention on its part in the Pacific, which it certainly has not; but it implies an equally "hands off" policy on

the part of Japan and other countries as well. The Washington Treaty recognized frankly the dominant interests of Japan in her own area in the Pacific in the expectation of the *status quo* being preserved. The spirit of the original proposals at the opening of the Washington Conference was virtual equality in the ratio of adopted tonnage for all types of ships, for instance, that Great Britain and the United States should be equal in all naval tonnage. The policy of the United States has frankly been that of a Navy "second to none," and this means that the U.S. Navy is short of the ratio some twenty light cruisers and several aircraft carriers, and over in submarines and destroyers. It was a distinct awakening when the British Navy protested against the gun elevation in six of the oldest capital ships of the U.S. Navy; in which protest the following occurs:

> The British Government makes an earnest appeal that the Government of the United States should not impose upon the people of the countries concerned, the burden of competition in armament, which are deemed to result from the execution of the proposal to elevate the turret guns on retained capital ships of the United States, it being considered that even if arguments can be found in support of the contrary interpretation of the Treaty, the effect of carrying out such a proposal will be incompatible with its intentions.

Which implies that the Washington Treaty concerned itself only with competition in battleships and that, in renouncing the construction of fourteen new capital ships carrying 16-inch guns, the United States renounced not only primacy at sea, but gave it back to Great Britain, where it has been for several centuries. The world also knows that no conceivable madness will bring about a direct clash between the navies of Great Britain and the United States, but here are two opposed policies, that of "primacy at sea" for Great Britain as a necessity of World Empire, and America's "second to none" based on equality in tonnage, both Governments being animated by the spirit of non-aggression. The same international spirit inspires both nations and they usually see eye to eye. The Washington Treaty did not settle this matter any more than it has stopped naval competition in armaments. While both countries have diplomatically patched up the wholly minor question of gun elevation, the sluice gate remains open on nearly everything else of real importance, including more debts, so why not have a second conference, or else frankly settle the real question out of court? It would seem very much to be desired in the present state of unrest of other than English-speaking peoples.

ALBERT P. NIBLACK.

CHAPTER VIII.

THE FUTURE OF THE SUBMARINE.

THE recent development and progress in submarine construction has been more in the nature of the improvement of machinery and instruments than of fighting qualities. No new problem has been solved by submarines recently constructed. The pre-war submarine, which was essentially a torpedo vessel, underwent considerable development of its warlike qualities during the war itself, particularly in the British and German Navies. The latter was the first to add small and medium calibre guns, to adapt the submarine to mine-laying, and to improve its radius of action and sea-keeping qualities, and the Germans also first undertook, to a limited extent, the transport of cargo in submarines. To the former, with the " M " class, belongs the credit of first installing a large calibre gun in a submarine.

After the war, the British seem to have endeavoured to realize the submarine cruiser with the " X " type ; but, with this exception, the different navies have been content with perfecting the types created during the war—torpedo, mine-laying, and long-distance cruising types—in the design of which they all benefited by the knowledge obtained from the surrendered German submarines. The outstanding feature of recent designs is the abandonment of the heavy gun and transport types. I maintain that it is particularly in the direction of these two types and of the submersible cruiser that future development will take place, and before discussing the possibilities of types it is opportune to consider the part played by the submarine in the Great War, the causes of the decadence of the surface ship, the necessity for solving the new problems, and to indicate the ways which seem to lead to these solutions.

THE SUBMARINE IN THE GREAT WAR.

Let us recall the real reasons making possible the suppression of the submarine campaign. In the North Sea the submarines were easily fought, chiefly owing to the configuration of the coasts and to the shallowness of the water, both of which were unfavourable for them. If the depth had been some hundreds instead of tens of fathoms, nets could not have been adopted so largely, extensive minefields could not have been laid, and the submarine would have had ample possibilities for escape after being sighted. Moreover, the Straits of Dover and the channel between the Shetlands and the Norwegian coast were guarded easily, and it was difficult for the

submarine to have access to more distant waters. In the English Channel particularly, the anti-submarine war could be carried on without interference from the German Fleet. Of the 178 submarines lost by the Germans during the war (neglecting the 21 which were interned or blown up by their crews), 68 were destroyed in the English Channel, and adding to these the 58 lost in the North Sea, we find that 71 per cent. of the losses occurred in these two theatres so favourable to anti-submarine warfare.

Thus we see that the submarine campaign, which threatened the downfall of the Allies, was suppressed essentially in the North Sea and the English Channel, and that this would not have been possible had the depth of these seas been greater or if the Germans had occupied the southern shore of the Channel at the beginning of the war, and so had been able to operate from bases with immediate access to the Atlantic. In this ocean, though they were intensely active, the losses of submarines were very small, and working from more suitable bases they could have maintained a far more effective blockade of Great Britain and have operated successfully against America, possibly dissuading that Power from intervening in the war or minimizing fatally its intervention. In making the occupation of Paris the chief aim of their advance the Germans lost the opportunity of occupying the shore of the Channel and were afterwards unable to dislodge the British, who had from the first understood this danger. This had its effect on the whole course of the war and ultimately led to the defeat of the Germans.

The blockade by the Allies of the Straits of Otranto did not combat the submarine campaign in the Mediterranean so successfully as that of the North Sea and Channel, and this was owing to the great depth of water which made the use of nets difficult and the laying of large minefields impossible. Once the submarines were in the Mediterranean, a large and deep sea, they were able to operate without considerable losses. A few boats paralysed Italian commerce to a greater extent than it was possible for a larger number to do in the case of British commerce, and the destruction of the Italian merchant fleet reached a higher percentage than did that of the British.

The geographical conditions which assisted the Allies to overcome the menace of the German submarines would be unlikely to occur in future wars.

Deficiencies of Early Submarines.

Other fundamental reasons for the success of the anti-submarine war were the insufficient military equipment of the submarines themselves and their excessive vulnerability. We must remember that the submarine was a new arm, and only evolved as an efficient arm during the war itself. None of the Powers had foreseen the great importance it eventually had, and the imperfect material could not in the early days be used to the best advantage. Submarines were employed almost entirely along the coasts, so that motor launches, patrol vessels, minefields and nets were easily able to

combat them. They were unable to attack the light craft without putting themselves in a position of inferiority. They were unable to emerge and fight with their guns as they often did against merchant vessels, owing to their slow speed which would soon have brought them to fighting at close range, when they would certainly have had the worst of the encounter. From a fight at close quarters they could not rapidly withdraw owing to their slowness in diving; nor could they avoid the often fatal counter-offensive of depth charges, either owing to the limited depth of the sea or the insufficient strength of their hulls, and also because of their slow underwater speed, which prevented them from getting away from the positions in which they had been located after showing on the surface. Moreover, they could not attack with torpedoes from any great distance with much chance of hitting, due both to the imperfections of the methods of firing and to the shallow draught of the anti-submarine vessels. Their vulnerability, too, in case of striking a mine was very great, the damage usually taking place at the forward end, and even though this was localized, the entry of even a limited amount of water caused longitudinal instability difficult to overcome. All these characteristics made, and still make, even the newest types of submarines far too vulnerable.

The Waning of the Surface Ship's Importance.

Now let us consider the waning of the surface ship's importance. We must recognize that the usefulness of ships of over 2,000 or 3,000 tons was seriously limited during the last war, and will, in my opinion, be still more in a future war, by the action both of submarines and of aircraft. Against the new offensive from the air and from underwater, surface ships must in harbour have recourse to numerous anti-aircraft batteries and fighting planes, and at sea to flotillas of light high-speed craft and fighting planes. But such means of defence would better be employed in offensive action against the enemy than protecting what is a doubtful means of offensive, and one which can be used only for very short periods of the war. In other words, it will be necessary to consider seriously whether, in addition to the enormous capital represented by ships of large tonnage, it is wise to immobilize other enormous sums for their protection, or whether this capital cannot be employed in arms suitable for a return which may be both continuous and extensive. Then there is the employment of poison gases, the effect of which the surface ships cannot avoid, while the submarine, able to do its work without communication with the open air, can escape.

The present-day capital ship, even of reduced displacement, being a surface vessel, will be discovered easily by aircraft and be continuously under observation both in harbour and at sea, so that it will never be able to take advantage of a surprise attack, which is one of the fundamental elements of warfare.

This may also be said of merchant ships, which must be able to keep the seas during wartime. The Allies were on the point of losing the war owing to the paralyzation of their merchant fleets,

and in future these will be unable to avoid the enemy's offensive either in harbour or at sea.

I therefore consider that underwater navigation, which can withdraw the vessels from continual observation by the enemy, imposes itself to the greatest degree both for warships and merchant vessels.

As on land armies take every precaution to keep themselves from observation by the enemy, so on the sea, at least when not fighting, it is well not to be exposed to the easy observation and offensive of the enemy. It is such a ready and, it should be added, such a necessary method of escaping observation for a vessel to submerge and at once disappear. On land every endeavour is made to hide the lines of communication and revictualling, and at sea submarine transport solves that problem very rapidly and with great facility.

It will, therefore, be necessary in the future to use vessels capable of navigating below the surface in place of the surface vessels, both in the war fleet and the merchant fleet. The first step has been taken in the case of the torpedo-boat, which on the surface had a very small offensive capacity, but which became formidable when submerged. Similar favourable results may be anticipated when battleships and cruisers are able to submerge, and merchant ships, in constant danger when traversing the surface during war, will become far more secure below the surface.

Recent Developments.

The "M," "X," and Deutschland Classes.

Three types of submarines, the British "M" and "X" classes and the German Deutschland, represent the first attempts to evolve the submarine battleship, cruiser, and cargo vessel respectively, and may be considered the precursors of the ships of the future.

The "M" class has shown the possibility of arming a submarine of moderate displacement (1,600 tons) with a 12-inch gun, though the speed, the arc of fire, and the limited depth permitted by the strength of the hull must be decidedly improved. From what is known of the new "X" type it has a speed of 22 knots, but its armament is only 4 guns of 5-inch calibre for a displacement of 3,000 tons, and the hull would seem to be of insufficient strength for any great depth. The Deutschland class was excessively complicated, difficult to manœuvre, and of very limited cargo-carrying capacity. However imperfect these were, they represented real attempts at development, and, though the advance is small, this is due to the old architectural standards of the experimental submarines being adopted, while more suitable standards must be adopted which will lead to far greater development.

Observations regarding the various types of submarines constructed or being designed can be summed up under the following heads :—

(1) Limited warlike characteristics dependent on the small displacement and small space available for increase of surface and submerged speed, small strength of hull, few mines, torpedoes, or guns carried.

(2) Limited submerged metacentric height leading to the employment of heavy fixed ballast to compensate the weights carried in the upper part of the vessel.

(3) Extreme vulnerability of hull both on the surface and submerged, and the fact that any damage in any part is generally fatal.

(4) Very complicated structure, machinery, and means for diving and navigating submerged, making the building difficult and long, the running of the submarine difficult and the training of the crews a lengthy one.

The importance of these observations increases with the displacement, dissuading designers from taking advantage of the improvements which such increase would allow, though they must thereby curtail some of the submarine qualities in order to develop others. Examples of this are given by the "M," the "X," and the Deutschland types.

Limitations in Newer Types.

In the "M" class, in order to allow a 12-inch gun to be carried, the weight of the propelling machinery had to be reduced, so limiting the speed and the surface and submerged radius of action, and the weight of the pressure hull had to be cut down considerably, with the result that the depth at which the submarine can navigate is relatively small. A large part of the weight saved in this way had to be used for the solid keel in order to ensure a metacentric height when submerged which, though not altogether satisfactory, was at least sufficient to guarantee stability.

In the "X" class, surface speed being required, the strength of the hull was reduced, as was the radius of action and the speed when submerged, the torpedo and gun armament was limited, and are not such as to correspond to the considerable displacement of the submarine.

The increased displacement of the Deutschland class gave an available weight and space which, though allowing some cargo to be carried, was not sufficient to make the solution practical or economical. Moreover, the difficulties of running and the complication of the various machinery increased, compared with smaller submarines, to a greater degree than did the displacement.

But the ideas followed in the design of these three classes, leading as they do to the restriction of qualities indispensable to the full development of underwater craft, cannot be taken as final.

That the present designs of hulls do not lend themselves to the development of the different qualities required is also shown by designs of submarines of large displacement appearing in the technical press, in which, though reaching displacements of 7,000 or 8,000 tons, they are still shown as armed very modestly, with speeds very little more than have existing vessels, and with torpedo and mine armament similar to those of submarines of far smaller displacement.

In all these, and the types previously considered, the weight of the hull and auxiliary gear increases at a greater rate than does the displacement, so that if the latter is increased threefold or fourfold there is not three or four times the weight available for the above- and below-water propelling machinery and the armament.

Need for Different Design of Hull.

We should, therefore, consider whether it is not possible to obtain more satisfactory results by adopting a radically different design of hull. Submarines constructed hitherto, though varying in types, have this in common, that their pressure hulls extend from end to end of the vessel, and I consider that it is this characteristic which hampers their development, causing the weight of the hull, auxiliary machinery and manœuvring gear to be so high a percentage of the total displacement, this percentage, as remarked, increasing with the increase of displacement.

Let us consider the two types which differ most widely, *i.e.* the Laboeuf and the Holland types, comparing them with the "O" type described by the author in the *Rivista Marittima* of May, 1924, where an example was illustrated, the displacement of which was limited to about 1,000 tons.*

The Laboeuf type and its derivatives, such as the German submarines, have an internal pressure hull, generally of circular section, reaching from one extremity to the other, along which is arranged a second external non-pressure hull, either on the sides alone, or on the bottom, and partly above as well, the main ballast tanks being between the two hulls.

The Holland type has similarly a pressure hull of circular section from end to end, within which, and particularly at the middle of the length, are built the ballast tanks.

The "O" type, however, has a pressure hull entirely of circular section limited to only the middle half of the total length of the hull, the non-pressure ends forming the ballast tanks.

Comparison of Types.

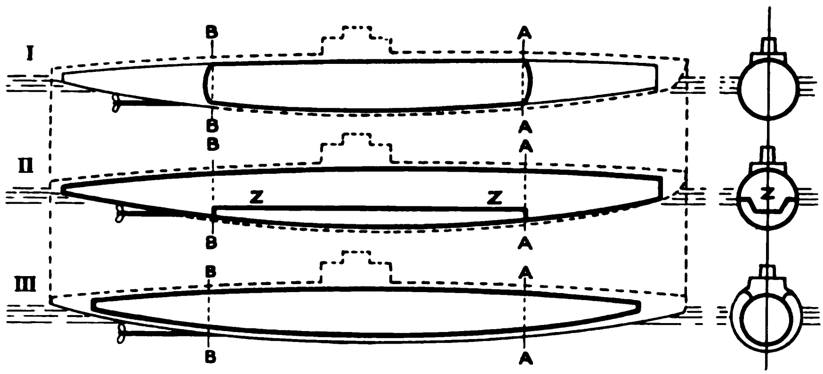
Let us suppose the three submarines, the diagrammatic outlines of which are shown on page 121, have each the same surface and submerged displacement, and have, therefore, pressure hulls of the same volume and the same reserve of buoyancy. Let us also suppose that they are capable of withstanding the same depth pressure.

The parts of the external pressure hull between AA and BB in the case of the "O" and the Holland types are of the same weight. There is therefore a greater weight of hull in the case of the Holland owing, on the one hand, to the presence of the structure ZZ forming the ballast tank, which must also be pressure-resisting, and on the other to the ends of the boat outside these sections being pressure-resisting, while in the "O" they are of light structure. The

* *Rivista Marittima*, May, 1924, "The 'O' Type Submarine": The example illustrated in this article was of 1,020 tons surface and 1,280 submerged displacement. Length, 73 metres; breadth, 6·25 metres; 8 torpedoes; 1 mine tube; speed, 19–20 knots surface and 11 knots submerged. Radius of action—surface, at 15 knots 4,000 miles, and at 8 knots 9,000 miles; submerged, 110 miles at 4 knots. Metacentric height submerged 38 cms.; pressure hull capable of a depth of 100 metres; time required for diving, 30 seconds; armed with 2 guns of 4-inch calibre, a.a., or 2 of 4·7-inch calibre.

structure ZZ requires a weight not less than 3 per cent. of the total displacement, and the pressure-resisting ends weigh more than the non-resisting ends of the " O " by 5 per cent. of the displacement, so that in all there is a saving in the case of the " O " of about 8 per cent. in these respects.

Taking the Laboeuf type we find that the pressure hull between AA and BB weighs less than that of the " O," being of smaller diameter, but taking account of the non-pressure hull of the Laboeuf between these sections and of the bulkheads and fastenings between the two hulls, it may be taken with close approximation that these parts of the hulls are of the same weight. But while there is a pressure and a non-pressure hull beyond these sections in the



Extent of Pressure Hull on Submarines.
I. "O" type; II. "H" type; III. Laboeuf type.

Laboeuf the former is not found in the " O," which again represents a saving of about 8 per cent.

To the above economies in the " O " type must be added those arising from the shorter shafting, piping, etc., owing to the greater simplicity and the smaller space occupied, and this represents a further saving of 2 per cent. of the displacement, so that in the " O " type there is 10 per cent. more of the displacement available than in the others for increase of speed and armament.

Advantages of Shorter Pressure Hull.

Another advantage arising from limiting the pressure hull to the middle part of the submarine is the possibility of obtaining increased submerged metacentric height without the need for ballast. The product of the distance between the centre of gravity with ballast tanks empty and the centre of volume of the parts which remain unflooded, multiplied by the displacement when in diving trim, gives the value of the stability when submerged, independently of volume and the position of the ballast tanks. The only way, then, to increase the submerged stability of a submarine of given displacement is to raise the centre of volume of the unflooded parts and lower the centre of gravity. Without departing from the best, *i.e.*

the circular, section of the pressure hull the centre of volume of the unflooded spaces is only movable within narrow limits, but the centre of gravity of the hull on the surface may be made lower, the lower the machinery and internal fittings can be installed. This can be attained only by increasing to the maximum the diameter of the middle transverse section of the non-flooding parts of the submarine, and since the volume of these represents exactly the displacement on the surface, it is evident that it is necessary to shorten the pressure hull. This is the essential characteristic of the "O" type submarine.

The increased stability obtained in this way will allow of weights, such as heavy guns, being more readily placed on deck in the "O" than in other types, and possibly also permit of the protection of the upper parts of the hull without excessively reducing the submerged metacentric height and without the sacrifice due to enormous weights of fixed ballast in the keel or the lower part of the hull.

The smaller size of the target offered to the enemy is of importance, being about half that of a submarine of other type, and would in itself be sufficient to make the "O" superior to the others. The non-pressure flooded bow is a considerable protection against mines when submerged, as damage to this part would seldom lead to the loss of the submarine. Other advantages are the simplicity of the internal arrangements, the easy disposal of the propelling machinery, the complete centralization of the controls, and therefore the easy handling of the submarine, and the speedy construction of the type, given the simplicity of the hull structure and of the internal fittings.

The characteristics of the "O" submarine of 1,020 tons make it specially suitable, not only for the usual duties of such a vessel, but also as an escort to ships and convoys, the examination and capture of which by enemy surface ships would, when so escorted, be rendered very difficult if not impossible, and in the future, if the Washington agreement is adhered to, the use of submarines of small displacement as escorts for convoys will become more common.

Increased Armament.

These outstanding advantages in the case of a submarine of small displacement become more important still as the displacement is increased, and by following the lines on which the "O" type is designed this increase may be made without the disadvantages which become so great with other types. The extra 10 per cent. of the displacement available and the improved metacentric height make it possible for submarines of 3,000 and 8,000 tons to utilize an additional 300 and 800 tons respectively to improve their warlike qualities, and therefore, without reducing the strength of the hull or the speed and radius of action, as in the case of the "M" class, heavy guns can be installed. Thus, two twin 8-inch mountings could be installed in a submarine of 3,000 tons, and two pairs of 12-inch or four pairs of 8-inch in one of 8,000 tons, with a speed in the case of the 3,000 ton vessel of almost 24 knots with Diesel engines.

It is therefore possible to take a considerable step towards the

construction of the submarine battleship capable of fighting surface ships with the not inconsiderable advantage of being able to remain almost awash, presenting the very limited target offered by the top of the pressure hull, which, emerging as a turtle back, would only with difficulty be injured by the enemy's projectiles.

Since in these ships, which are not intended for underwater attack, the submerged speed is of small importance and can be limited to the four or five knots required for underwater control, a great part of the weight usually required by the batteries can be used for strengthening the hull or increasing the gun-power or surface speed.

Difficulties of Increasing Speed.

While the problem of the increase of size and number of guns appears sufficiently easy of solution the other two problems which it is also necessary to solve are not so easy. They are the very great increase of speed required for the submarine cruiser and the protection from underwater attack, indispensable when the displacement reaches eight or nine thousand tons.

I do not consider the method adopted by the British Admiralty in the " K " class is the best. The difficulties and dangers arising from the numerous and large openings of the funnels, inlets and discharges for condensers, air intakes for furnaces, the size of the pressure hull, the inevitable high temperature of the air on submerging after surface-running, the risk of smoke when lighting up and increasing speed and the possible flaming and sparks at the funnel at night make the adoption of steam propelling machinery unsatisfactory. It would perhaps be better to substitute for the heavy and cumbrous Diesel engines some light type of engine using a light fuel not so inflammable as petrol. Numerous small explosion engines may be grouped to drive the propeller shaft through mechanical reduction gearing, or each may drive a dynamo which may be connected to the motors already fitted. This method, though it does not realize the saving of weight per h.p. obtained with boilers and steam turbines, permits, however, of a considerable saving compared with Diesel engines, and of space occupied compared with steam engines, so that the satisfactory solution of the problem can be foreseen.

Underwater Protection.

Concerning underwater protection, which in surface ships of 10,000 tons is not, and cannot be, satisfactorily realized, it is considered that, following the design of the " O " type, and by limiting the underwater propulsion to that necessary for diving and making small changes of position, there will be sufficient weight saved to provide for the protection of the pressure hull, extending as it does only half the length of the submarine. Instead of being a very thick hull it may be made double with the two hulls about two metres apart, each of great thickness. From calculations made for a

submarine of 8,000 tons, the external hull would be 30 mm. thick and the internal hull 40 mm., or about $1\frac{3}{16}$ inches and $1\frac{9}{16}$ inches respectively, for that part of the pressure hull which remains underwater when the submarine is on the surface.

The space between the two hulls would be closely subdivided, and for maintaining equilibrium the limited flooding in case of striking a mine or being hit by a torpedo would be compensated rapidly by emptying suitable trimming tanks.

The two thicknesses may be added together to form one horizontal deck of great thickness on the upper turtle back which would be above water during action. This would be such as to be almost invulnerable to the enemy's fire which cannot have a very steep trajectory, since fighting would take place at within 10,000 yards, a submarine awash being practically invisible at greater range.

The above- and below-water protection possible in a submarine of the type we have described certainly cannot be realized in a surface ship. The bottom of the hull in the latter cannot be protected and the protection of the sides below water is limited to the bulges. A great part of the available weight is absorbed by the vertical and horizontal armour extending the whole length of the ship, while in the "O" submarine the vertical armour does not exist and the horizontal may be thicker, since the length is considerably less than that of the surface ship, as the extremities even if damaged do not compromise the submarine's stability or capacity for continuing the fight and keeping the sea as is the case with the surface ship.

Improved Fighting Qualities.

Submarines constructed on these lines could be employed so as to influence decisively the conception of sea warfare. They would not be exposed to observation and daily attack in harbour by aircraft, as they would usually be able to remain submerged and hidden. They would be immune from gas attack. They could move from one theatre of war to another without easily being followed, and could act suddenly and unexpectedly. On meeting enemy surface ships they would have considerable superiority of fire because of the small and scarcely visible target they would offer, which would be almost invulnerable when trimmed down. They would have underwater protection which the surface ship could not have. The latter would retain superiority of speed, but this would not be of much use if it did not serve for undertaking the offensive, and this would easily be prevented by the submarines.

The foregoing serves to show the possibility of realizing a great development of the submarine warship in the not distant future. The same ideas should lead to the development of submarine merchant ships which in wartime would represent the best means of revictualling maritime nations and of guaranteeing the safety of communications as well as, when supported by submarines and aircraft, for carrying out surprise landings on the enemy's coasts.

V. de Feo.

CHAPTER IX.

Naval Geography.

The meridian along which the map of the world is to be cut is usually chosen so as to avoid severing the continents. One, when reckoning from Greenwich, which is marked by a meridian divisible by ten, is preferred. That commonly selected is 180° which, by placing the meridian of Greenwich in the middle, distributes the eastward and westward meridians symmetrically on either side, as is convenient for the reckoning of time. When the world is shown, not as a whole on a rectangular sheet, but in two circular maps of opposite hemispheres, the meridians 90° W. and 90° E. are not, however, used as central lines, for a cut at 0° longitude traverses Africa and continental Europe. A cut is therefore made down the Atlantic along 20° W., which involves cutting the Pacific along 160° E. This not only has the particular disadvantage of placing Australia and New Zealand in different hemispheres, but the general disadvantage of failing to make an accurate fit of the right and left margins of the map of the world, of which the common form is that on Mercator's projection. Neither does this pair of hemispheres provide a map which connects the coasts of the Pacific.

An Unsuitable Map.

The map cut at 20° W. is particularly unsuitable for the study of naval communications, since it does away with the continuity of the sea route from Great Britain to Canada. The ordinary Mercator map divided at 180° is, however, not inappropriate for the representation of British naval communications, for our chain of naval stations and trooping ports extends from Bermuda and the Atlantic coast of Canada eastwards to the China Sea and the south-western Pacific, but not across the eastern Pacific. The meridian 160° W., however, makes a better division of the Pacific than that at 180°. In particular, the former keeps many more of the islands of the south Pacific on the Australasian side, to which they physically belong. In the interests of political geography also it is desirable to keep as many as possible of the British islands in the Pacific on the same side of the map as Australia and New Zealand. The meridian 160° W. is, also, more significant than that of 180° in the strategic geography of the Pacific, because it passes just west of Oahu, the Hawaiian island in which are situated the commercial port of Honolulu and the American naval station of Pearl Harbour.

Although the mid-Pacific is so open, yet, on account of the great

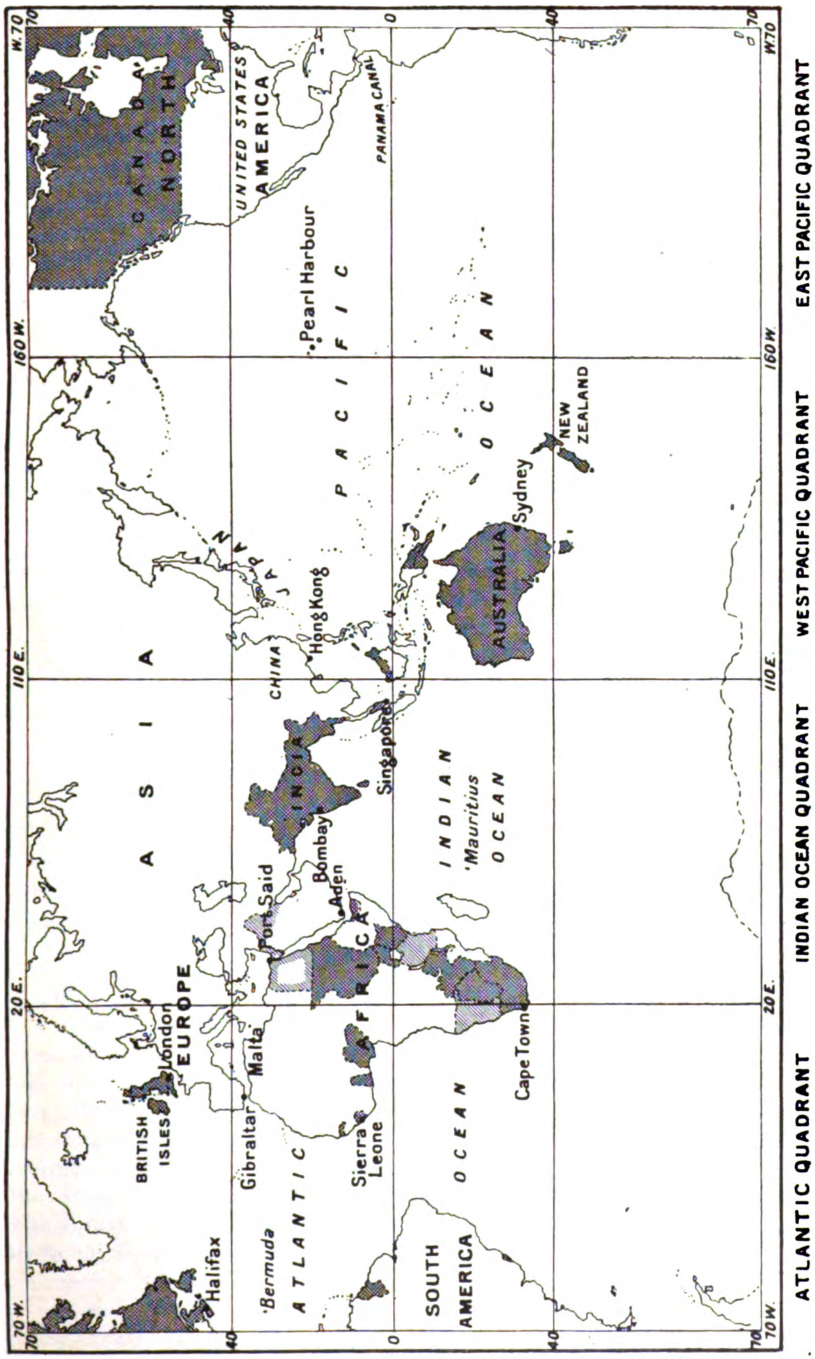
extent of the ocean, there is not the freedom of routes which the appearance of the map suggests. Although there is no defile to force navigation to a junction, the necessity of fuelling makes the Hawaiian islands a commercial and strategic focus. If we were to cut the Mercator map at 160° W. instead of 180° it would be centred on the meridian 20° E., a line of great naval significance, for it passes through Cape Agulhas, the south point of Africa, situated in the South African Union, where a White population forms a resident garrison.

This pivot of navigation on one of the routes to India is also mid-way to Australia and New Zealand on one of the routes from Great Britain. In addition to the facilities of Cape Town as a port of call, the Union is now provided at Durban with one of the World's largest dry docks. In the northern hemisphere, the meridian 20° E. traverses the Mediterranean, where three of the five great naval Powers have first-class stations, and reaching the European mainland just east of the Straits of Otranto marks the limit of the home waters of the Western Powers.

Uninterrupted Sea Communications.

As repetition is practicable on cylindrical projections such as Mercator's, it is possible to secure the continuity of both Atlantic and Pacific oceans by constructing a map on which either the east coast of the Atlantic or the west coast of the Pacific is shown twice, and one or other of these devices is sometimes adopted. Against the convenience of such a map for reference must be set the great drawback that it confuses the mental picture of the World which we carry in the mind's eye. The utility of a map of the whole World to the student of naval geography depends largely upon the clearness of the picture which it leaves in the memory. A clear and sharp mental picture of the World is part of the equipment required for a life's study of the strategical problems arising out of World politics, and confusion is made in the memory if the same place is shown in two different places.

We have, therefore, to construct a map without repetition, which shall show naval communications with as little interruption as possible. The ocean, being continuous, must be cut somewhere, and the best that can be done is to find a meridian which is not crossed by the fleet of any Power when cruising between its stations. Before the construction of the Panama Canal, it would not, I think, have been possible to find a meridian fulfilling this condition, for the American fleet had to steam half-way across the Atlantic in order to round the eastern promontory of Brazil on its route to the Hawaiian islands, but now the route from the naval shipbuilding yards is west of 70° W. The ports of the United States, including Portland, Me, lie west of this meridian ; Bermuda and the Atlantic ports of Canada lie to the east ; and although there are British possessions in the Caribbean to the west and American West Indian possessions to the east of the line, it is not crossed by the fleet of either Power in cruising between its principal stations. Neither is it crossed in


ATLANTIC QUADRANT
INDIAN OCEAN QUADRANT
WEST PACIFIC QUADRANT
EAST PACIFIC QUADRANT
CANADA
NORTH
AMERICA
UNITED STATES
PANAMA CANAL
Pearl Harbour
PACIFIC
OCEAN
NEW ZEALAND
Sydney
AUSTRALIA
JAPAN
Hong Kong
CHINA
ASIA
Singapore
INDIA
Bombay
Aden
INDIAN
OCEAN
Mauritius
Port Said
AFRICA
EUROPE
London
BRITISH ISLES
Malta
Gibraltar
Cape Town
Sierra Leone
ATLANTIC
OCEAN
Bermuda
Halifax
SOUTH
AMERICA
70 W.
160 W.
110 E.
20 E.
W.70
70
40
0

such cruising by the fleets of France, Italy, or Japan. In the southern hemisphere the meridian crosses Tierra del Fuego and reaches the southern ocean near the junction of the coasts of the Argentine and Chile, both minor naval Powers. This is, moreover, near Cape Horn, so that the meridian marks pretty closely the turning point of navigation between the Pacific and South Atlantic, just 90° west of the meridian of Cape Agulhas.

The Washington Line.

Cutting the map along the meridian 70° W. we find the World centred on the meridian 110° E. As a central line among the passages to the Indian Ocean from the East Indian archipelago, this is the best meridian which can be found of those divisible by ten, or even by five. It leaves Indo-China on the left and Australia on the right, the straits of Malacca and Sunda on the left, and the other passages of the East Indian archipelago on the right. This meridian is commonly omitted from Atlas maps of the world, which usually include only meridians divisible by twenty, or by fifteen if the object be to mark the hours. Thus, when emphasizing the importance of this meridian in lectures on strategical geography during the Great War, I had to put it in by hand upon the lantern slide, marking it with a broad ink line. Since then the meridian has become familiar to every one interested in world politics as "The Washington Line," the eastern limit beyond which the development of naval stations in the Pacific is restricted by the Treaty signed at Washington on February 6, 1925.

Our map being centred on the meridian 110° E., it will be noticed that the meridian dividing the left-hand hemisphere into its quadrants is 20° E., which, as already pointed out, is of great naval significance. The meridian which divides the hemisphere on the right into its quadrants, 160° W., is also of naval significance, as has already been partly explained. But the strategical significance of the meridian has been greatly increased by the Washington Agreement, although the line is not mentioned in the treaties. The territorial provisions contained in Article XIX. of the Treaty signed at Washington on February 6, 1922, prohibit the British Empire, America and Japan from the further development and fortification of naval bases in the Pacific east of the Washington Line, with the exception of the islands constituting Japan proper, Australia and New Zealand with the adjacent islands, the United States with its adjacent islands, and the Hawaiian islands. The Kuriles belonging to Japan, and the Aleutian islands are specifically mentioned as not to be developed. An examination of the map shows that these provisions work out in such a manner that the territorial restrictions are, without any important exception, confined to the quadrant comprised between 110° E. and 160° W.

Panorama of Naval Geography.

It will be observed that two things have so far been accomplished in our investigation, first, a meridian has been found for the cutting

of the Mercator map which permits the chain of both British and American naval stations to be shown without discontinuity; and, secondly, three other meridians of fundamental naval importance have been found which happen to be equidistant from one another and from that chosen for the cut. I term the quadrants between these meridians the Atlantic Quadrant, 70° W. to 20° E., the Indian Ocean Quadrant, 20° E. to 110° E., the West Pacific Quadrant, 110° E. to 160° W., and the East Pacific Quadrant, 160° W. to 70° W.

A striking panorama of naval geography is obtained by viewing in succession a series of four hemisphere maps on Mollweide's equal-area projection centred upon these fundamental meridians. The hemisphere centred on 20° E., comprising the Atlantic Quadrant and Indian Ocean Quadrant, may, from the standpoint of naval geography, be properly termed the Mediterranean Hemisphere. It displays centrally the long succession of straits which intervene between the manufacturing countries of Europe and the populous part of Asia, namely the Baltic entrances, straits of Dover, Gibraltar and Malta, and straits of Bab el Mandeb. Exactly central in the southern hemisphere is the Cape, the most important turning-point and port of call south of the equator.

Revolving the globe 90°, which is equivalent to six hours of the natural revolution of the Earth, the visible hemisphere comprises the Indian Ocean Quadrant and West Pacific Quadrant. Its central meridian, 110° E., traverses the East Indian archipelago, and the hemisphere may, therefore, from the standpoint of naval geography, be properly called the East Indian hemisphere. Of the important straits which front the observer not very far from the central meridian, the most northern is the Formosa Channel marking the boundary between the Japanese and Occidental possessions in the great festoon of islands in the West Pacific. Here lie the Pescadores islands, possessions of Japan, where naval development is debarred by the Washington Agreement.

The Singapore strait, the eastern entrance of the long passage called the Straits of Malacca, is the most important eastern gateway of India, whether by land or sea, for no rail or road traverses the mountain barrier by which India is shut off from the Sino-Japanese region.

"East Indian Hemisphere."

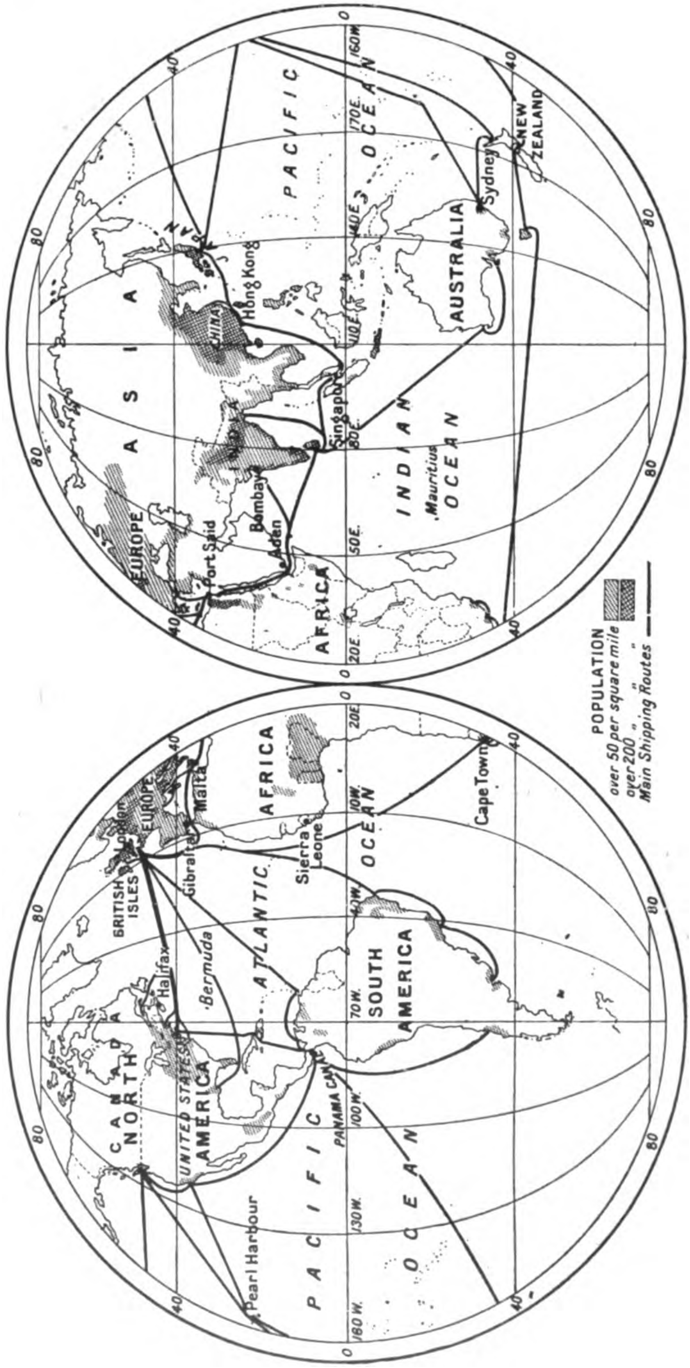
South of Sumatra another entrance to the Indian Ocean the straits of Sunda more directly flanks the route from Colombo to Fremantle. Near the eastern entrance of the strait is Batavia, capital of the Dutch East Indies, 525 nautical miles from Singapore.

Near the central line on its left are the French dominions of Indo-China, and not far on the right, in the southern hemisphere, is Fremantle, the western port of Australia and the nearest landing place for British reinforcements.

This map, which I have called the East Indian hemisphere, is more truly Oriental from the racial and historical point of view than the "Eastern Hemisphere" usually shown in atlases. The latter, centred on the meridian 70° E., unites all Europe with Asia. The

WEST INDIAN HEMISPHERE

EAST INDIAN HEMISPHERE



East Indian hemisphere, centred on the Washington Line, excludes Western Europe, whilst leaving Constantinople and Cairo united with Asia in accordance with the religious connections of these capitals. On this map, Japan appears as the only country where battleships are built ; Australia and New Zealand are shown isolated from the centres of the White Race and relatively near the dense populations of the Monsoon region of Asia. Neither Malta nor Pearl Harbour are visible, both being over the brow of the world's horizon, and so much the more does the strategic importance of Singapore leap to the eye on this map, standing as it does near the central point in a position which is focal as well as central, being a junction of navigation from north-west, north-east and south-east.

The Pacific Hemisphere.

Revolving the globe another 90°, the meridian 160° W. fronts the observer, and the view is bounded by the great circle formed by the meridians 110° E. and 70° W. This hemisphere, which comprises the West Pacific and East Pacific Quadrants, is appropriately named the Pacific Hemisphere, alike in physical, commercial and naval geography. Some West Indian possessions of the United States lie beyond the right-hand margin of the map, but it includes the whole of the series of calling places of the American fleet from Hampton Roads to Manila. Of these Guantanomo in Cuba, Colon, Balboa at the Pacific entrance of the Panama Canal, and Pearl Harbour, can be developed and fortified. Further on in the West Pacific Quadrant are the fuelling station of Guam and Manila itself, capital of the Philippines.

It is important to grasp the position of Manila with reference to the Atlantic ports of the United States, which are necessarily the ultimate base of America's naval power. The steaming distance from New York to Manila by way of Panama is the same, to within some fifteen miles, as that by way of Suez. At the risk of seeming too elementary in the setting out of this subject it may be suggested that when looking at this map we should remember to make the slight effort of imagination which is needed to correct the impression of flatness which a map inevitably produces upon the sub-conscious mind. Fixing the eye upon the intersection of the equator with the meridian 160° W., let us think of this point as projecting towards us by an amount as great as the distance from the centre to the edge of the map. Keeping this bulge well in mind, let us now think of the true alignment of the coasts of Asia and the Americas all the way from Johore, the mainland behind Singapore, to Arica in Chile, where the coast of South America turns. If we take up a terrestrial globe, and, instead of making it revolve on its polar axis, turn it so as to keep this coast line in front, we shall see that its general course is perfectly direct. Its only general curvature is that of the Earth's surface, as in the case of the equator itself, and this straight run continues rather more than half-way round the world.

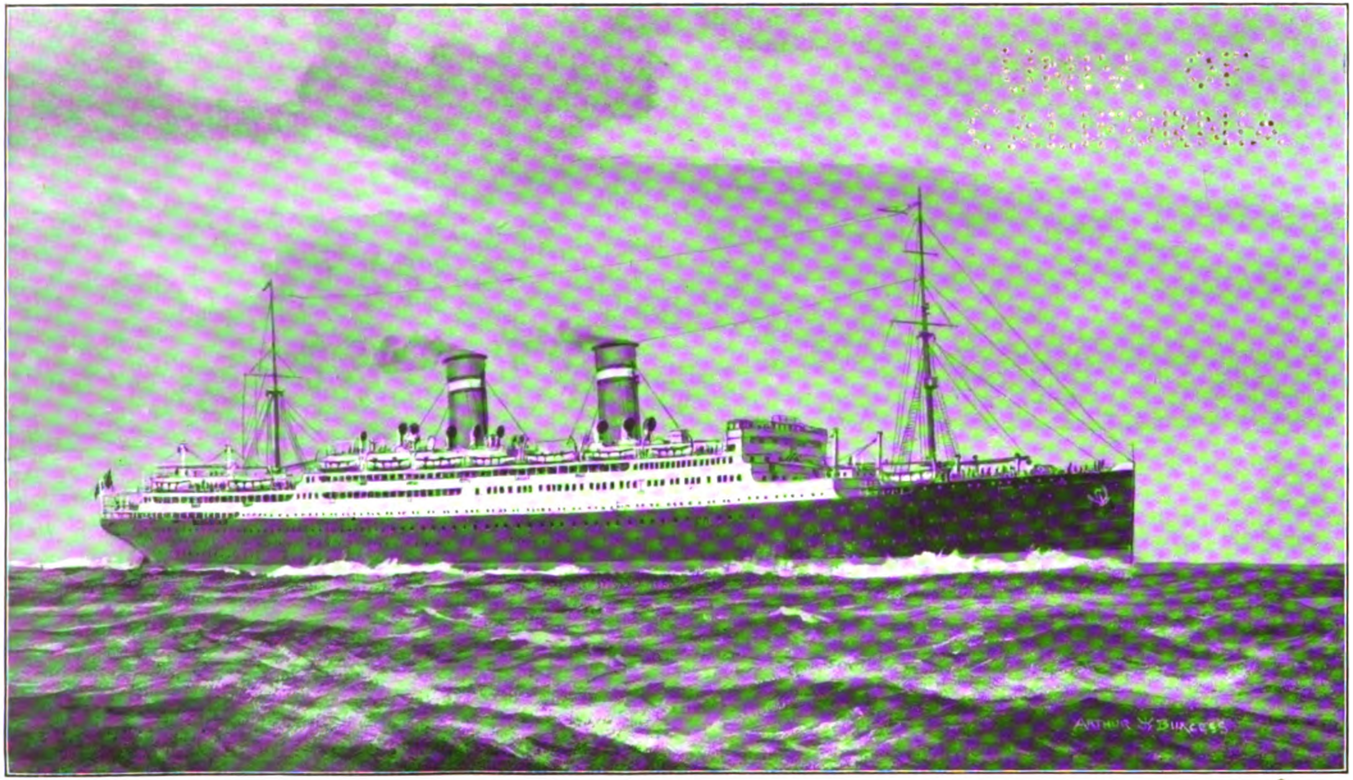
A Misleading Impression.

Thus the appearance which is presented by a map of the world, or of a hemisphere, or by a globe viewed in the usual way, of a North Pacific ocean half enclosed by an encircling coast line is entirely misleading. The coasts of the North Pacific being a straight line, in the only sense in which a line upon the earth's surface can be straight, the direct steaming track from Vancouver to Hong Kong runs, of course, close to the Aleutian and Kurile islands. The chains are, in fact, not remote from navigation as they appear to be at first sight, a circumstance which gives importance to the mutual agreement of America and Japan not to undertake the naval development of either group.

It only remains to turn the globe through another 90° and we have a hemispherical view centred on the meridian 70° W. This hemisphere comprises the East Pacific Quadrant and Atlantic Quadrant, and as the central meridian traverses the West Indies the map may, from the standpoint of naval geography, be called the West Indian hemisphere. This is a useful supplement to our Mercator map cut at 70° W., for it shows without interruption the steaming tracks from Europe to the ports of the United States and the Pacific ports of Canada and South America. From the standpoint of naval geography the most important feature shown centrally on this map is the vital system of communications from the Atlantic and Mexican Gulf ports of the United States to Colon, with the naval stations of Guantanomo and Key West guarding the passages east and west of Cuba. In this connection it is worth noticing that Cuba occupies in the West Indies a position which is analogous in physical geography to that of Sumatra in the East Indies.

Vaughan Cornish, D.Sc.

MERCHANT SHIPPING SECTION.



(From a drawing by Arthur J. W. Burgess.)

LLOYD SABAUDO LINER CONTE BIANCAMANO.

(Constructed by William Beardmore & Co., Ltd., Dalmuir.)

CHAPTER I.

The World's Mercantile Marine.

A year ago we were constantly being told that the state of the shipping and shipbuilding industries was so bad that it could hardly become worse, and accordingly it would improve in the near future. To-day, after twelve long months, the optimists can still find no better argument, while the situation has certainly not improved. It is high time for us to face the plain fact that not only is the world's demand for sea transport and for new ships reduced, but also that in spite of our age-long experience and resultant advantages we are at the moment apparently incapable of offering our special products in the open international market with any prospect of securing a reasonable return for the capital and labour which they represent. It would be sufficient of a calamity if shipping and shipbuilding were alone in this situation, but it is unfortunately true of most of the main industries of our country.

It would almost appear that as a nation we are incapable of realizing how irrevocably we are committed to development on industrial lines; only through our trade with other countries can we exist, let alone maintain our world position—and the only means whereby our trade can survive is by meeting the competition of other countries. From our own resources we could support merely a fraction of our population, and it is only by supplying the needs of other countries cheaper than they can be supplied internally or by other competitors, that the bulk of our people can be kept from starvation. It is to feed our workshops with raw material, and to take their products to our customers, that our shipping and shipbuilding industries exist; did we not possess that distribution service, we should be forced to employ other ocean carriers, and our goods would be taxed by heavy delivery charges—an overwhelming handicap in our trade competition, whereas the possession of a predominant fleet is an equivalent advantage.

The present position is complex in the extreme; but however complicated it may seem, it is capable of being reduced to the terms of international marketing, and there is no excuse for the baffling obscurity of diction in which so many of our economists appear to revel. The late war itself can be viewed as a specially savage "rate-cutting" war, and by such means can be brought more nearly into perspective than the prevalent view, which regards it as being responsible for the whole, instead of a part, of our present troubles.

The above is, after all, the position from our national viewpoint;

it must not be forgotten that the situation is an international one. The unalterable law of supply and demand, to which our national life must inevitably conform, applies with equal force to the world's trade. Viewed as a whole, there is only a certain amount of goods to be transported, and consequently there is only a certain demand in the world for ships. That demand fixes the limit in the number of ships which can find profitable employment. Industrial pressure at home drives a nation to engage in overseas trade, and so long as it is more profitable to supply home demands than to adventure overseas, the need for a merchant fleet will be negligible. The extent of internal industrial pressure therefore determines the share which any particular nation will have in the world's business of sea transport, and any artificial attempt to obtain a greater share will be foredoomed to ultimate failure.

The World's Merchant Fleet.

Before turning to a consideration of our own national position, therefore, it will be well to see how the world's supply of merchant tonnage is at present distributed between the various countries, and information on this point is contained in Table I.

TABLE I.—SEAGOING STEEL AND IRON STEAM AND MOTOR TONNAGE OWNED BY THE PRINCIPAL MARITIME COUNTRIES.*

(Thousands of gross tons, *i.e.* 000's omitted.)

Country.	As at June, 1914.	As at June, 1921.	As at June, 1923.	As at June, 1924.	As at June, 1925.
Great Britain and Ireland	18,877	19,288	19,077	18,917	19,274
British Dominions	1,407	1,950	2,219	2,214	2,230
British Empire	20,284	21,238	21,296	21,131	21,504
United States	1,837	12,314	12,467	11,823	11,605
Austria-Hungary	1,052	Nil	Nil	Nil	Nil
Denmark	768	866	920	974	1,008
France	1,918	3,046	3,265	3,193	3,262
Germany	5,098	654	2,496	2,856	2,993
Greece	820	576	743	751	890
Holland	1,471	2,207	2,606	2,533	2,585
Italy †	1,428	2,378	2,788	2,676	2,894
Japan	1,642	3,063	3,402	3,655	3,741
Norway	1,923	2,285	2,299	2,326	2,555
Spain	833	1,094	1,169	1,163	1,120
Sweden	992	1,037	1,092	1,146	1,215
Other countries	2,398	3,459	3,396	3,303	3,413
Foreign total	22,230	32,979	36,643	36,399	37,281
World's total	42,514	54,217	57,939	57,530	58,785

* Sailing vessels are not shown, as there are now only 2¼ million tons owned in the world. American and Canadian Lake vessels are *not* included.

† Now includes Trieste.

While there has undoubtedly been a considerable reduction (which has been estimated to be of the order of 20 per cent.) since 1914 in the quantity of goods to be carried, it is to be seen that there has been an increase of over 38 per cent. in the amount of tonnage owned in the world. It is also to be observed that among the smaller maritime countries there has been a disproportionate rate of increase, as will be seen from the following figures :—

TABLE II.—SEAGOING STEEL AND IRON STEAM AND MOTOR TONNAGE OWNED IN EACH OF THE PRINCIPAL MARITIME COUNTRIES, EXPRESSED AS A PERCENTAGE OF THE AMOUNT OWNED IN 1914.

Country.	Percentage.	
	June, 1921.	June, 1925.
United Kingdom	102·4	102·1
British Dominions	138·6	158·6
British Empire	104·7	106·0
United States	670·6	631·8
Denmark	112·8	131·2
France	158·8	170·0
Germany	12·8	58·7
Greece	70·2	108·6
Holland	150·0	175·7
Italy *	166·6	202·6
Japan	186·6	228·0
Norway	118·8	132·8
Spain	123·8	126·9
Sweden	104·5	122·4
Other countries	100·3	98·9
Foreign countries	148·3	167·7
World	127·5	138·3

It must be obvious that these movements are to a certain extent artificial in character, the notable examples being the increase in the United States and the decrease in Germany.

OIL TANKER TONNAGE.

It would, of course, be false to suppose that the whole of the increase which has taken place since 1914 is unnecessary. The growth of the oil industry has been phenomenal, and has called for the creation of a new and specialized fleet. In 1914 there were only about 1½ million tons of oil tankers owned in the world, whereas to-day there are some 5¼ million gross tons, as will be seen from Table III.

In addition to the figures given in Table III. there are approximately 50,000 gross tons of vessels under 1,000 tons, so that the present total of tanker tonnage is some 3¾ million tons above the 1914 figure. Deducting the amounts of tanker tonnage owned, the world total of other merchant tonnage in 1914 was 41 million tons, and is to-day 53½ millions.

* Now includes Trieste.

Table III.—Gross Tonnage of Oil Tankers, of 1,000 Gross Tons and above, owned in the Principal Maritime Countries of the World, as at the End of June, 1925.

Country.	Gross Tonnage.
Great Britain and Ireland . . .	1,708,978
British Dominions	185,836
British Empire	1,894,814
United States	2,281,324
Belgium	34,982
Denmark	9,647
France	151,089
Germany	55,754
Holland	148,109
Italy	128,904
Japan	47,137
Norway	243,455
Spain	30,648
Sweden	4,873
Other countries	146,894
Total	5,177,630

The Employment of Tonnage.

It is clear that in the present depressed state of world trade the above figures can be no real index to the world's demand for tonnage, and in point of fact it is well known that there is a large amount of merchant tonnage laid up in the world's ports, either temporarily or permanently. Much of this idle tonnage consists of vessels hastily built during or immediately after the war, which are unlikely ever to find their way back into service ; the majority of this class of tonnage is owned by the United States Government, and after many abortive attempts to find some other use for it, the question of

Table IV.—Tonnage laid up in the Principal Maritime Countries of the World.

(Thousands of gross tons, *i.e.* 000's omitted.)

Country.	January, 1922.	January, 1923.	January, 1924.	January, 1925.	June, 1925.
United Kingdom . . .	1,769	1,010	909	705	1,130
Australia	50	107	85	166	175 *
United States	5,309	5,328	4,271	4,223	4,253
France	1,085	730	450	311	219
Holland	327	330	235	65	180
Japan	120	99	29	25	36
Italy	585	472	427	225 *	262
Scandinavia	572	92	63	45	109
Greece	170	76	122	24	99
Belgium	275	170	86	26	68
Spain	530	520	128	60	73
Idle in other countries † .	192	195	83	103	149
Total	10,984	9,129	6,888	5,978	6,753

* Estimated.
† Mainly belonging to the countries quoted above.

scrapping on a wholesale scale is now being considered. The remaining laid-up tonnage is obviously not required by the world for transportation purposes at present, and it is doubtful whether any demand will arise while the age of the vessels will permit of their economical employment.

The extent of this factor can be gauged by the figures given in Table IV., which shows the idle tonnage of the principal maritime countries at the beginning of each year since the problem became of vital importance.

The outstanding feature of this table is the huge total of tonnage laid up in the United States; this mainly consists of Government-owned tonnage, the figures for privately owned shipping in the United States being as follows:—

	Thousands of gross tons.
January, 1922	781
January, 1923	703
January, 1924	541
January, 1925	417
June, 1925	366

The increase in the world total of over three-quarters of a million tons from January to June, 1925, is most disquieting, and is eloquent testimony to the continuation of the shipping depression.

The deduction from the total world merchant tonnage of the total tonnage laid up, *i.e.* approximately $6\frac{3}{4}$ million tons, and of the increase in tanker tonnage since pre-war days (namely, $3\frac{3}{4}$ million gross tons), leaves a total of $46\frac{3}{4}$ millions, which compares with 41 millions in 1914.

TABLE V.—ESTIMATED APPROXIMATE AMOUNT OF SEAGOING STEAM AND MOTOR TONNAGE EMPLOYED BY THE VARIOUS MARITIME COUNTRIES IN 1925.

(Thousands of gross tons, *i.e.* 000's omitted.)

Country.	Gross tonnage owned, June, 1925.	Oil tanker tonnage owned, June, 1925.*	Tonnage laid up, June, 1925.	Estimated gross tonnage employed, to compare with the tonnage owned, 1914.	Tonnage employed, 1925, as percentage of tonnage owned in 1914.
United Kingdom	19,274	1,709	1,130	16,435	87·0
British Dominions	2,230	186	175 †	1,869	132·8
British Empire	21,504	1,895	1,305	18,304	90·2
United States	11,605	2,281	4,253	5,071	276·0
France	3,262	151	219	2,892	150·7
Germany	2,993	56	—	2,937	57·6
Holland	2,585	148	180	2,257	153·4
Italy	2,894	129	262‡	2,503	175·3
Japan	3,741	47	36	3,658	222·8
Scandinavia	4,778	258	109	4,411	119·7
Spain	1,120	31	73	1,016	115·0
Other countries	4,303	182	316	3,805	89·1
Totals	58,785	5,178	6,753	46,854	110·2

* Excluding vessels under 1,000 tons gross.
† Australia only; others unknown.
‡ Estimated.

After making all these deductions there is still a large surplus of available tonnage, and while it remains there is little prospect of better conditions, since no large increase in trade above the pre-war volume is to be anticipated. It may be of interest to make an approximate calculation of the amount of seagoing tonnage which is actually employed at the present time as compared with 1914; this may be done by assuming that the total amount of tanker tonnage represented by vessels above 1,000 tons gross is equivalent to the legitimate expansion which has taken place —an estimate which will be greater than the real figure by something like one million tons—and deducting this and the amount of tonnage laid up from the total seagoing tonnage owned in the various countries. The figures are given in Table V. It will be seen that even after these generous allowances have been made, the only two countries employing an amount of tonnage less than their 1914 total are the United Kingdom and Germany. In the other maritime countries there have been large expansions, which hardly seem to be justified, in view of the decrease in world trade.

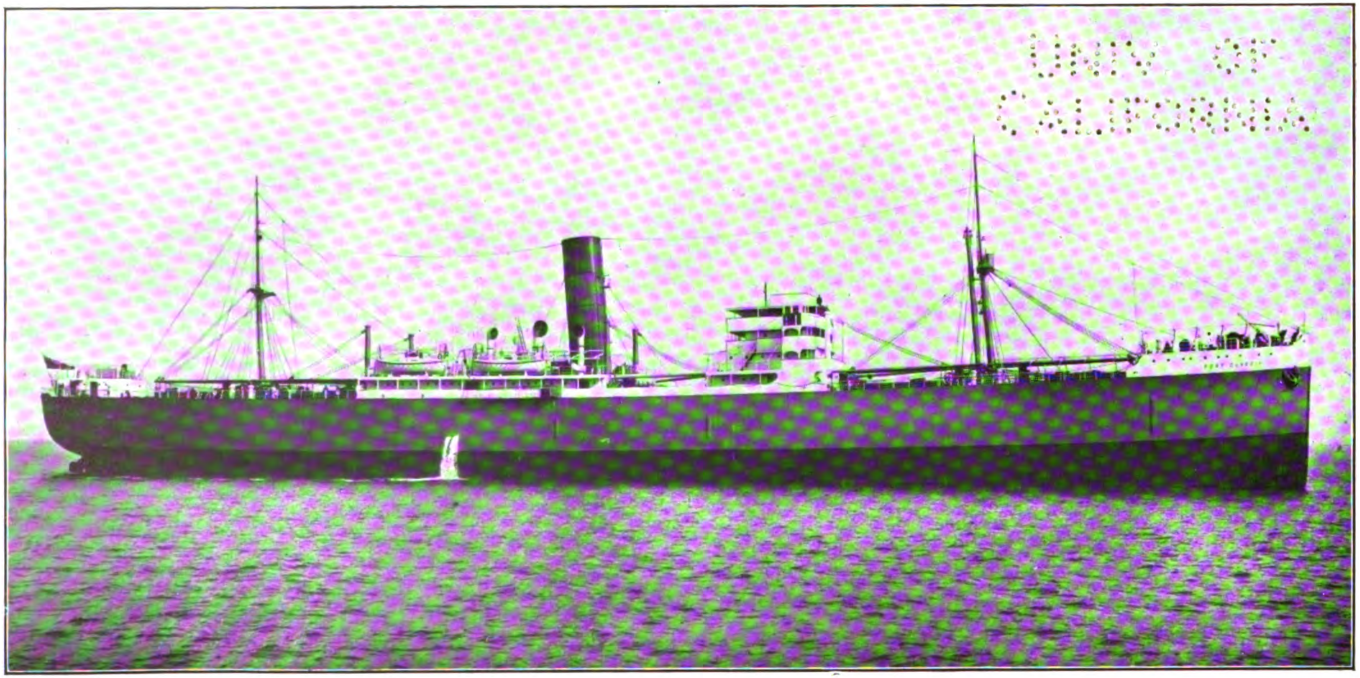
The Efficiency of Tonnage.

It is obvious from the foregoing remarks that the efficiency of the world's sea transport compares very unfavourably with the pre-war position. With less than the pre-war volume of goods to be transported, there are more ships engaged in carrying them—and it is, of course, known only too well that ships are sailing with half and quarter cargoes; that vessels are being run at a loss, rather than incur the greater loss involved in laying them up. Such a situation cannot continue indefinitely, and ultimately the efficient units of the world's fleet will be retained, the remainder being forced off the seas by economic pressure.

Table VI.—Percentage of the Total Seagoing Steam and Motor Tonnage owned in the Principal Maritime Countries which was over 20 and 25 Years old in June of the Years shown.

Country.	20 years and under 25.				25 years and over.			
	1922.	1923.	1924.	1925.	1922.	1923.	1924.	1925.
United Kingdom	11·2	11·1	10·2	9·7	8·0	8.2	8·5	8·5
Dominions	10·3	12·9	11·7	12·1	19·0	18·7	20·3	17·7
United States *	4·3	4·4	4·4	3·7	4·3	4·6	4·7	4·6
Denmark	11·0	11·9	12·1	13·3	15·1	15·2	14·7	15·2
France	8·9	8·8	9·2	10·2	12·7	12·7	11·3	11·1
Germany	12·7	10·0	9·9	8·2	13·6	12·9	15·2	14·9
Holland	7·6	8·2	6·0	5·8	3·2	3·1	3·4	3·2
Italy	14·6	14·7	13·4	13·6	17·6	18·0	18·6	21·4
Japan	8·1	8·1	9·5	9·5	18·2	18·3	18·6	19·8
Norway	7·3	7·8	8·1	9·9	10·7	11·6	11·6	11·8
Spain	10·5	9·3	8·0	6·4	41·3	42·9	43·3	45·3
Sweden	9·3	9·3	9·1	7·1	26·5	28·2	29·9	31·4
Total world fleet *	9·3	9·5	9·1	9·1	11·6	11·9	12·6	13·1

* Excluding American Great Lakes vessels.



COMMONWEALTH AND DOMINION LINE MOTORSHIP PORT DUNEDIN.

The Port Dunedin and her sister ship Port Hobart were the first motorships to trade between British and Australian ports.

(*Constructed by Workman, Clark & Co., Ltd., Belfast.*)

One indication of the way in which the efficiency of the world's mercantile fleet is being impaired is given by the figures which have been published by Lloyd's Register since 1922 of the age of merchant tonnage. In 1922, 11·6 per cent. of the gross tonnage of steam and motor vessels owned in the world was 25 years and over in age; by 1923 this percentage had increased to 11·9; in 1924 it was 12·6; and in 1925 it is no less than 13·1. While unfortunately it is not possible to give any comparative figure for the pre-war fleet, the persistent increase in old tonnage over the past four years is sufficiently disquieting in itself. In Table VI. more detailed particulars are given.

It is of interest to note the British figures (*i.e.* 9·7 and 8·5 respectively), since before the war approximately 6 per cent. of the British fleet was between 20 and 25 years of age, and 7 per cent. 25 years old and above.

Methods of Propulsion.

It may be argued that the gradual increase in the proportion of old shipping is to some extent due to the progress in the science of shipbuilding, and to the increasing amount of attention paid to the maintenance of ships whilst in service; but it must not be forgotten that there is a sense in which progress in the design and construction of ships lessens the "expectation of life" of a ship. When development in design is proceeding slowly, the deciding factor in the life of the ship will be the cost of maintenance; but when rapid changes in design are taking place, a new factor is introduced into the situation. The newer type will offer advantages in the way of such items as reduced first cost, quicker voyages or turn round in ports, greater relative capacity, reduced operating costs, and so forth. A shipowner will no longer find it profitable to retain an old ship in service by reason of the fact that while the gradual ageing of ship and machinery has largely increased the cost of operation and maintenance, the capital charges have presumably been written off—for competition will demand that he offer his customers the benefit of the new improvements, and this competition will therefore set a limit to the economic life of the older ship. Such a change took place when Sail gave place to Steam, when Wood was succeeded by Steel; such a change has been taking place again during the past few years, by the introduction of Oil. It will be seen from Table VII. that whereas in 1914 only 3·1 per cent. of the world's tonnage was propelled by oil, in 1925 nearly 32 per cent., or roughly one-third of the total gross tonnage owned in the world, was dependent on the new fuel, either used direct or under boilers.

So much has been said during the past year of the many advantages of oil as compared with coal for marine propulsion, that it would be wearisome to recapitulate the arguments in its favour; no better proof of the demand for the new fuel could be furnished than the fact that at a time of world-wide shipping depression there has been such a rapid development in this direction. There are those who prophesy a change as sweeping as that from sail to steam; but the warning is necessary that the use of oil fuel for steam raising

is not only wasteful of the world's resources of oil, but may actually be uneconomical to the shipowner, in spite of the advantages of cleaner ships, quicker turn round, and the like. For instance, from the recent annual report of one shipping company, operating on short trips, it is observed that by reconverting from oil-burning to coal the company's fuel bill was reduced to 56 per cent. of the figure when oil had been in use. The demand for oil for land purposes is so heavy that no material reduction in the price of oil fuel is to be anticipated, and until such a reduction does take place, definite limits will be imposed on the use of oil for steam raising at sea, and—although to a lesser degree—on the use of internal combustion engines.

TABLE VII.—PERCENTAGES OF THE WORLD'S TOTAL FLEET OF MERCHANT VESSELS USING THE VARIOUS FORMS OF MOTIVE POWER.

NOTE.—The percentages given are of the total gross tonnage owned in the world; sailing vessels with auxiliary power are included under the appropriate section for their engines and the section for vessels using oil fuel under boilers includes all vessels capable of being so employed—a number of such vessels are capable of utilizing either oil or coal, and may be using either.

Motive power.	1914.	1922.	1923.	1924.	1925.
Sail power only	8·06	4·70	4·34	3·92	3·50
Internal combustion engines	0·45	2·35	2·56	3·09	4·20
Oil fuel under boilers . .	2·65	22·34	24·23	26·79	27·54
Coal	88·84	70·61	68·87	66·20	64·76
	100·00	100·00	100·00	100·00	100·00

Undoubtedly, however, a rapid change is taking place in the motive power of the world's fleet, and it is significant that at the end of June, 1925, nearly 48 per cent. of the merchant tonnage under construction throughout the world was to be propelled by internal combustion engines. This change must of necessity affect the economic life of existing tonnage, and it is probable that altogether some 10 to 15 million gross tons of the present world fleet should rightly be described as obsolete.

SHIPBUILDING AND SHIPBREAKING.

It is fairly obvious that the world's demand is not only for ships, but for the most efficient ships possible, and that consequently a cessation of shipbuilding until our existing surplus has been absorbed would be no real remedy for the present situation. Indeed, the law of demand is so strong in its application that even at the worst of the shipping depression, *i.e.* during the year 1923, over a million and a half tons of merchant vessels were launched, while in 1924 the total increased to nearly 2¼ million tons. Whatever difficulties lie in our path, it is hardly conceivable that the yearly total of merchant ship output will ever again drop below a million gross tons, and the strong probability is that it will average from 1½ to 2½ million tons for the next few years, especially in view of the rapid introduction of the motorship.

Moreover, it would appear that the world has already reached the approximate minimum number of ship casualties. In spite of an increase in the world's merchant tonnage owned from 34¾ million gross tons in 1904 to over 64½ millions in 1925, the tonnage involved in total losses has remained fairly constant in quantity over that period (except for the war years), the amount of tonnage lost ranging between 400,000 and 500,000 gross tons each year.

Unless, therefore, some overwhelming cataclysm occurs, the probability is that over the next few years there will be an annual surplus of ships built over ships lost of from one to two million gross tons. We have no right to expect anything like a commensurate increase in world trade, and our only hope of again reaching the pre-war standard of efficiency, or even of retaining only the present condition of the world's fleet, lies in an unprecedented campaign of shipbreaking.

Before the war, shipbreaking rarely accounted for more than 200,000 gross tons per annum: if we are to retrieve our position, the programme for the next few years must not be far short of two million tons a year. In this connection the figures given in Table VIII. will be of interest. Whereas the world's trade is less in volume to-day than in 1913, it will be seen that since that year there has been a net increase to the world's fleet of nearly 20 million gross tons. After making every possible allowance for the legitimate increase in the tanker fleet, there remains at least 14½ million gross tons above the pre-war level. Some encouragement can be taken from the fact that in 1924 over a million gross tons were broken up, but unless still more strenuous efforts are made in this direction, we cannot but look for a large increase in the amount of tonnage laid up, and a consequent indefinite prolongation of the depression which the shipping industry has had to face for so long.

TABLE VIII.—GROSS TONNAGE OF MERCHANT VESSELS LOST, BROKEN UP, AND LAUNCHED IN THE WORLD FOR THE YEARS 1913 TO 1924 INCLUSIVE.*

Year.	Tonnage lost.†	Tonnage broken up.	Total deductions.	Tonnage launched.	Net increases or decreases to world's fleet.
1913	445,265	87,737	533,002	3,332,882	+ 2,799,880
1914	773,934	96,728	870,662	2,852,753 ‡	+ 1,982,091
1915	1,867,386	26,332	1,893,718	1,201,638 ‡	− 692,080
1916	2,714,982	9,059	2,724,041	1,688,080 ‡	− 1,035,961
1917	6,602,478	4,783	6,607,261	2,937,786 ‡	− 3,669,475
1918	3,330,354	2,437	3,332,791	5,447,444 ‡	+ 2,114,653
1919	514,234	9,938	524,172	7,144,549 ‡	+ 6,620,377
1920	510,794	7,801	518,595	5,861,666 ‡	+ 5,343,071
1921	458,756	77,545	536,537	4,341,679	+ 3,805,142
1922	428,756	315,110	743,866	2,467,084	+ 1,723,218
1923	494,364	962,506	1,456,870	1,643,181	+ 186,311
1924	440,404	1,174,258	1,614,662	2,247,751	+ 633,089
Totals .	18,581,943	2,774,234	21,356,177	41,166,493	+19,810,316

* Excluding American Great Lake vessels.
† Including war losses.
‡ No returns from Germany for these years.

Shipbuilding in the Principal Maritime Countries.

Before passing to a consideration of the conditions obtaining in certain of the more important countries, it will be well to examine broadly what changes have taken place during recent years in the shipbuilding output of the world. We have seen that whereas 3,332,882 gross tons of merchant shipping were launched during the year 1913, ten years later—in 1923—the figure was only 1,643,181 tons, and for 1924 was still only 2¼ million gross tons, although at the "peak" year, in 1919, the yards of the world actually turned out over *seven million gross tons* of merchant ships—and that in addition to a very considerable amount of warship work. The key to present conditions lies to a very great extent in the simple fact of that huge and largely unnecessary expansion, and in the subsequent inevitable but none the less painful reorganization. Tables IX. and X. trace the history of these movements as they affect the principal countries, and an appreciation of the story they tell is essential to a proper consideration of the conditions in the individual countries.

Table IX.—The World's Shipbuilding Output.

(Thousands of gross tons, *i.e.* 000's omitted.)

Country.	1913.	1919.	1920.	1921.	1922.	1923.	1924.
United Kingdom	1,932	1,620	2,056	1,538	1,031	646	1,440
British Dominions *	27	298	174	118	53	37	30
British Empire	1,959	1,918	2,230	1,656	1,084	683	1,470
Germany †	465	?	?	509	575	358	194
United States ‡	228	3,040	2,349	995	97	96	90
France	176	33	93	211	185	97	80
Holland	104	137	183	232	163	66	64
Japan	64	612	457	227	83	72	73
Austria-Hungary	62	—	—	—	—	—	—
Italy §	50	83	133	165	101	67	82
Scandinavia	110	147	164	195	103	112	120
Other countries	43	79	96	129	43	12	10
World's total	3,261	6,049 ‖	5,705 ‖	4,319	2,434	1,563	2,183

These figures are remarkable evidence of the colossal effort at the close of the war, and of the even more violent reaction which has since taken place. The persistent increase over the pre-war level in Japan and Italy is particularly worthy of note, although in the case of the latter it should be remembered that the shipbuilding centre at Trieste, formerly Austro-Hungarian, is now included under Italy.

* Excludes Canadian Great Lake vessels.
† Including Danzig.
‡ Excluding Great Lake vessels.
§ Now includes Trieste.
‖ Excluding Germany.

TABLE X.—PERCENTAGE OF WORLD'S TOTAL AMOUNT OF TONNAGE BUILT IN THE PRINCIPAL SHIPBUILDING COUNTRIES, AND PERCENTAGE WHICH EACH COUNTRY'S OUTPUT IS OF THE 1913 TOTAL.

Country.	Percentage of world total.					Percentage of 1913 total.				
	1913.	1919.	1921.	1923.	1924.	1913.	1919.	1921.	1923.	1924.
United Kingdom	59·2	26·8	35·7	41·4	66·0	100·0	83·8	79·6	33·4	74·5
British Dominions	0·8	4·9	2·7	2·3	1·4	100·0	1103·7	435·4	137·0	111·1
British Empire	60·0	31·7	38·4	43·7	67·4	100·0	97·9	84·5	34·9	75·0
Germany	14·3	—	11·8	23·0	8·9	100·0	—	109·4	77·0	41·7
United States	7·0	50·3	23·0	6·2	4·1	100·0	1333·3	436·6	42·1	39·5
France	5·4	0·5	4·9	6·2	3·7	100·0	18·8	119·8	55·1	45·5
Holland	3·2	2·3	5·4	4·2	2·9	100·0	131·8	223·0	63·5	61·6
Japan	2·0	10·1	5·2	4·6	3·3	100·0	956·0	354·6	112·6	114·0
Austria-Hungary	1·9	—	—	—	—	100·0	—	—	—	—
Italy	1·5	1·4	3·8	4·2	3·8	100·0	166·0	330·0	134·0	164·0
Scandinavia	3·4	2·4	4·5	7·1	5·5	100·0	133·6	177·3	101·9	109·1
Other countries	1·3	1·3	3·0	0·8	0·4	100·0	183·8	299·9	27·9	23·2
World's total	100·0	100·0	100·0	100·0	100·0	100·0	185·6	132·5	48·0	67·0

The increase in the percentage built in Great Britain and Ireland from 41·4 in 1923 to 66·0 in 1924, coupled with the world increase from a million and a half to nearly 2¼ million tons of seagoing vessels, might at first sight be made the grounds for a measure of optimism; but figures of output, valuable though they may be, are not as important as figures of work in hand. The economist and statistician are constantly sighing for records of the orders booked by the various industries—if such were available, forecasting would be far easier and on a far more solid basis; in most industries, however, they have to content themselves with figures of output.

TABLE XI.—SHIPBUILDING AT HOME AND ABROAD.

(Millions of gross tons.)

Quarter ending	United Kingdom.			Other countries.			World total.		
	Under construction.	Commenced	Launched	Under construction.	Commenced	Launched	Under construction.	Commenced	Launched
Sept., 1919 *	2·817	—	0·416	5·232	—	1·371	8·049	—	1·787
Sept., 1920 *	3·731	0·594	0·483	3·834	0·788	1·005	7·565	1·382	1·488
Sept., 1921 *	3·283	0·051	0·308	2·260	0·265	0·539	5·543	0·316	0·847
Sept., 1922	1·617	0·082	0·307	1·456	0·106*	1·186	3·073	0·188*	1·493
Sept., 1923	1·271	0·112	0·066	1·067	0·100*	0·288	2·338	0·212*	0·354
Dec., 1923	1·395	0·245	0·115	1·049	0·228	0·217	2·444	0·473	0·332
Mar., 1924	1·474	0·228	0·362	1·043	0·204	0·189	2·516	0·432	0·551
June, 1924	1·517	0·375	0·365	1·100	0·244	0·164	2·617	0·619	0·529
Sept., 1924	1·468	0·253	0·360	1·113	0·278	0·192	2·581	0·531	0·552
Dec., 1924	1·297	0·195	0·353	1·173	0·290	0·194	2·470	0·485	0·547
Mar., 1925	1·165	0·202	0·339	1·231	0·193	0·267	2·396	0·395	0·606
June, 1925	1·094	0·190	0·298	1·276	0·232	0·295	2·370	0·422	0·593

* Excluding Germany and Danzig, returns for which were not available.

But in the case of shipbuilding, while it is true that the company order books are not open to their inspection, yet as soon as the construction of a vessel is commenced it is shown in the quarterly returns of Lloyd's Register of Shipping. The figures of tonnage commenced form the real guide to the immediate prospects of the shipbuilding industry, and so are worthy of close study. It will at once be seen from Table XI. that over recent quarters there has been a persistent decrease in the tonnage commenced in Great Britain and Ireland, and that even in the tonnage launched there has been a corresponding movement, other countries benefiting at the expense of Great Britain.

The United Kingdom.

Turning to a consideration of some of the principal maritime countries individually, we may say at once that there is no ground for optimism over the increased output of Great Britain and Ireland for 1924 as compared with 1923; indeed, from the point of view of the shipbuilding industry of this country the position could hardly be worse. The plain and obvious fact is that the world's shipbuilding plant was at least doubled as a result of the war shortage of merchant tonnage, while now the world's demand for ships is greatly reduced as compared with pre-war days. It requires little thinking to realize that for many years there will be no economic need for a large proportion of the berths now in existence, and that consequently these must be reduced, either by agreement or by competition—and reduction by agreement is obviously impossible. The post-war depression is not ended—the plain truth is that for some time to come contracts will have to be accepted without profit, or even at a loss, if yards are to remain open at all. The game of competition is one in which the longest purse wins, and the present position is due chiefly to two forms of foreign competition—firstly, continental yards have been brought into existence or greatly extended during and after the war; therefore any hope of seeing a return on the capital invested lies in weathering the present storm, and work must be found at all costs, to keep the organizations together. Secondly, yards in some continental countries have benefited through the falling value of currency by reducing or even eliminating their debenture liabilities, while association with other industrial interests has created a very strong financial backing for certain continental shipbuilding firms.

Shipyard Capacity.

The expansion in shipyard capacity which took place during the war was to a certain extent natural and inevitable—it is both common sense and good business to buy a spoon if it is raining soup, as our American cousins would say. But the present position seems to be due not so much to the wartime expansion as to a subsequent alarming increase in the capacity of our continental competitors, for which the only explanation appears to be the hope that low currency values and lesser labour troubles may give them a permanent advantage over British yards.

In order to test the accuracy of this impression, the writer has made an approximate calculation of the *capacity* (as distinct from output) of various continental countries, and of Great Britain, for the building of seagoing vessels. The only basis upon which such a calculation could be made was to group the berths in the various establishments according to divisions of length of the vessels which could normally be built upon them. Information upon this point is hard to obtain, and it must be understood that the table given below can only be a very rough estimate. Two hundred and fifty feet has been chosen, quite arbitrarily, as the lower limit of the table, on the assumption that vessels of less than that length will, in the main, be for coasting and home trade only. Naturally, too, the figures form no guide to the relative efficiency of the various countries; in some cases three or four boats could be built on a berth to one on a similar berth elsewhere.

TABLE XII.—ESTIMATED CAPACITY OF THE SHIPYARDS OF GREAT BRITAIN AND VARIOUS CONTINENTAL COUNTRIES, ACCORDING TO CERTAIN DIVISIONS OF LENGTH OF BERTH.

Country.		Numbers of berths falling into the various divisions of length in feet.							
		250 to 300.	300 to 400.	400 to 500.	500 to 600.	600 to 700.	700 to 800.	800 and over.	Total.
Belgium	1914	—	3	4	1	—	—	—	8
	1920	—	2	4	2	—	—	—	8
	1925	—	2	4	2	—	—	—	8
Denmark	1914	3	6	—	4	—	—	—	13
	1920	6	17	4	—	4	—	—	31
	1925	6	14	9	—	5	—	—	34
France .	1914	9	10	6	6	14	—	9	56
	1920	8	22	8	8	16	—	11	73
	1925	8	21	22	10	17	—	11	89
Germany	1914	26	43	24	28	8	4	7	140
	1920	21	52	32	35	8	6	7	161
	1925	21	53	32	39	9	6	7	167
Holland	1914	12	28	11	27	6	—	—	84
	1920	10	35	18	28	6	—	18	115
	1925	13	51	32	32	9	—	15	152
Norway.	1914	—	13	7	2	—	—	—	22
	1920	4	16	8	2	5	—	—	35
	1925	4	15	13	—	5	—	—	37
Sweden	1914	3	8	4	3	—	—	—	18
	1920	3	8	12	5	—	—	—	28
	1925	2	10	12	6	1	—	—	31
Total, Seven Countries	1914	53	111	56	73	28	4	16	341
	1920	52	152	86	80	39	6	36	451
	1925	54	166	124	89	46	6	33	518
Great Britain	1914	67	108	101	61	58	95	90	580
	1920	101	182	128	127	55	97	116	806
	1925	68	135	109	135	46	94	99	686

It will be seen from Table XII. that by 1920 the shipyard capacity of this country had increased by something like 40 per cent., and is now still nearly 20 per cent. above the pre-war figure. It is probable, if unpalatable, that we have to face a further reduction of at least a hundred berths, before our shipyard house is thoroughly set in order. But the decrease in capacity in this country since 1920 has not been paralleled on the Continent, where there was a gain of over 32 per cent. in 1920 over the pre-war figures; in point of fact, the aggregate capacity of the seven countries shown in the table shows to-day an increase of approximately 52 per cent. above the pre-war total.

Foreign Competition.

Whatever discounts have to be made from these figures, they furnish undoubted evidence of an expansion which is responsible for a severity of competition never before seen—so much so, in fact, that it has ceased to be of interest only to the industry itself, but in one outstanding instance has even reached the general public, via the headlines of the daily press. The particular case which aroused public attention was the placing of a contract by Messrs. Furness Withy & Co. with the Deutsche Werft for five motorships at approximately £60,000 *per ship* less than the lowest British tender; even with the shipping company's public offer to accept £10,000 a ship above the German figures, British firms could not compete, in spite of the fact that estimates had been made with no allowance for establishment charges, let alone profit; even if the workmen in the British yards had given their labour for nothing, the contract could not have been retained.

The facts were startling in the extreme; attempts were made to trace the difference to one or more particular factors—to the price of coal, steel, engines, or auxiliaries, to the longer hours or lower rates of wages in Germany; but even allowing for all these, the difference was still too spectacular to be entirely convincing, and the opinion has still to be dispelled that despite denials on the point the contract was to some extent artificial in character, and that subvention, or perhaps some other special financial circumstance, is yet to be disclosed.

Nevertheless, the fact remains that over the past few months a large volume of work has been lost to this country through foreign competition. The difference in price is usually smaller than in the Furness Withy order, but the steady succession of lesser losses has far more effect on the industry than the single contract which aroused such widespread attention.

A most interesting example of what has been taking place occurred when the Siamese Ministry of Commerce invited tenders for two motorships to trade from Bangkok. It was significant, in the first place, that instead of confining tenders to two or three selected firms in this country (as would almost undoubtedly have been the procedure before the war) the Siamese Government obtained prices from no less than nine countries. More significant still was the huge range of

prices—from £166,125 to only £63,400 for one ship, and from £294,000 to £124,350 for the two.* Not only was there much variation as between country and country, but also between firms in the same country, and the published figures furnish interesting reading :—

Nationality of shipbuilders.	No. of firms competing.	Range of price for :	
		One ship.	Two ships.
		£	£
British Isles	12	105,300–131,300	208,000–261,500
France	6	87,065–166,125	172,826–294,000
Italy	6	63,400–104,000	124,350–205,000
Germany	7	89,180–120,300	176,400–236,000
Holland	4	101,650–125,000	201,300–245,000
Denmark	3	92,700–113,500	183,400–225,000
Sweden	1	100,000	195,000
Japan	2	110,500–119,500	215,475–233,025
China (coast yards)	3	91,500–105,000	182,000–205,000

It will be understood, of course, that there are varying conditions as to date of delivery and so forth which render these figures not strictly comparable; but it is obvious that there is a serious attempt on the part of certain foreign countries to obtain contracts which would normally go to this country. Some of the prices are so low that suspicion of direct or indirect State or Municipal subvention is inevitable, although this has been repeatedly denied.

Nothing could be so disastrous for this country than for such competition to be successful over any long period ; the internal pressure which drove Great Britain to the sea, which drove her to shipbuilding, also drove her to export new ships as part of her manufactures. And to-day, when shipbuilding has become a vital part of the national industrial machine, it is little short of a catastrophe that our shipyard trade unions should have well over 30 per cent. of registered unemployment (no less than 45 per cent. on the North-East Coast), and that over the past year there should have been an average of only some 30 per cent. of the building berths in our shipyards occupied by new work. The plain fact is that the cost of our article is too high, especially in view of the general impoverishment of the nations after the war. The British yards have a long and varied experience in shipbuilding, and surely it is no empty boast to say that our skill and workmanship are unequalled. But a purchaser who cannot afford a highly priced article must and will buy a cheaper one, to tide him over the present depression, although he knows that in the long run it may be less satisfactory.

The motorship enthusiasts have urged that part of the success of foreign countries is due to their recognition of the importance of this new prime mover. Germany in particular has been cited as concentrating on motorship production, and there has been much

* For full list of tenders and prices, see *Shipbuilding and Shipping Record* September 10, 1925.

talk of standardized Diesel engines. But a glance at the shipbuilding figures published by Lloyd's Register of Shipping is sufficient to show that Germany holds no monopoly in motorship construction. During 1924 Great Britain produced 50 motor vessels, of 237,458 tons gross, or 47·3 per cent. of the world output; Germany built 28 motorships, of 96,141 gross tons, or 19·2 per cent., leaving 33·5 per cent. to other countries. In 1921 Great Britain produced 28 motorships, of 102,356 tons gross, or 33·4 per cent., while Germany built 22 such vessels, of 33,333 gross tons, or 10·9 per cent. This country has therefore actually improved her relative position in this respect since 1921.

It is to other causes we must turn for an explanation of the present difficulties. The question of wages and hours, for instance, is undoubtedly serious. German shipyards work a 54-hour week; the skilled timeworker at the beginning of this year received approximately 33*s.* a week, the semi-skilled 30*s.*, and the unskilled 26*s.* Working seven hours a week less, the British skilled man now receives 56*s.*, the semi-skilled 42*s.*, and the unskilled 38*s.* For the same number of hours worked, the German rates would therefore be as low as 45–55 per cent. of the British, although it is only fair to say that there has been a recent wage increase in German yards—the skilled worker, for instance, now receiving approximately 40*s.*—which increases this figure to 60–70 per cent. of the British. The British shipbuilding industry before the war was rightly proud of the fact that it paid as high wages as any other of the big industries, and even then some discrepancy existed between the two countries in respect of wages. But the difference was nothing like the present 30 or 40 per cent.; moreover, this figure does not represent the full effect of the difference between the two countries. Both in coal-mining and steel making there is a similar difference in wages and hours, and this naturally affects the price of coal and steel. Its importance can be gauged from the fact that four tons of coal are required to produce one ton of steel from the ore, and an average-sized cargo steamship requires anything up to 3,000 tons of steel. If therefore the price of coal is reduced 2*s.* 6*d.* per ton, the cost of steel is reduced 10*s.* a ton, *i.e.* for 3,000 tons of steel there is a reduction of £1,500.

It is useless to argue that since the cost of living is higher in this country than in Germany or Holland, the increase in wages is natural. A ship represents so many hours of work, and, apart from any question of relative speed of working (which might not be in the British favour), for a similar ship the same number of hours will be required in Germany or Holland as in this country. The wage cost would therefore be some 30 to 40 per cent. lower abroad—a colossal handicap to successful competition. Some idea of the relative rates of wages can be obtained from the following schedule, obtained from an American source, in which are shown comparative weekly wages paid to various classes of workmen in Great Britain, Holland, and Germany, based on a week of 48, 59½, and 54 hours respectively, and converted into dollars at the current rates of exchange. It will, of course, be understood that the rates are for

timeworkers only, and are not necessarily representative of piece work rates :

COMPARATIVE WEEKLY WAGES IN DOLLARS.

	Great Britain.	Holland.	Germany.
Blacksmiths	16.22	14.52	8.10
Machinists	16.22	14.52	8.10
Boilermakers	20.45	14.28	8.10
Carpenters	16.22	15.24	8.10
Patternmakers	19.04	16.19	8.10
Joiners	16.22	14.28	8.10
Electricians	16.22	15.00	8.10
Labourers	12.69	12.38	6.48

The fact must be borne in upon any unprejudiced observer that either wages or hours must be adjusted before there can be any hope of equal conditions as between country and country. No one has any desire to increase the hours of the British worker, but the longer hours worked on the Continent form a serious barrier to our successful competition in the international market for tonnage. The International Labour Office has prided itself on the international agreement for an eight-hour day—is it too much to hope that the British Government should interest itself in the extraordinary mental arithmetic whereby some 60 hours can be worked in a week of eight-hour days ?

DISPARITY OF WAGE ADJUSTMENT.

But unfortunately even the serious difference between British and continental rates and hours does not exhaust the dangers of the wages position. The shipbuilding industry of this country is unique in the magnificent sacrifices made both by workmen and employers in the endeavour to keep the yards open ; unfortunately some other industries of this country do not have to face international competition, and as a result have not the same incentive to close scrutiny of wage rates.

It is perhaps fair to say that before the war there was approximate equality of opportunity as between industry and industry ; through the long years of development a " rule of thumb " balance had been obtained, for any unequal advantage in a particular trade would result in an over-flow of applicants, and a consequent reduction of conditions to the normal. It may therefore be taken that the pre-war level of wages *as between industry and industry* was approximately correct.

But the war lasted sufficiently long to have an appreciable effect on apprenticeship, the trades then in demand receiving an undue proportion of the newcomers, and furthermore the war brought its own grim curtailment in the numbers of the trades which were not immediately essential to the purposes of the war, while certain trades were necessarily exempted from such dangers. All these war exigencies have resulted in a serious derangement of the normal relationship between wage rates in the several industries, as will be seen from Table XIII., which gives the percentage increase in *weekly* rates of wages, as at July, 1925, over the rates current in July, 1914.

The percentages are mainly based on official figures of the Ministry of Labour, and on the averages of the recognized rates of wages in the principal towns or districts. In some few cases daily or monthly rates have been used, where weekly rates have not been available. It must also be pointed out that it has not been possible to make any correction of the percentage figures in respect of the differing number of hours now worked per week.

TABLE XIII.—PERCENTAGE INCREASES IN WEEKLY RATES OF WAGES IN VARIOUS TYPICAL CLASSES OF WORKMEN IN CERTAIN INDUSTRIES OF GREAT BRITAIN.

Industry.	Percentage increase, July, 1925, over July, 1914.
Agriculture *—	
Ordinary labourers	56
Bakery	115
Boot and shoe industry	100
Building—	
Bricklayers	81
Painters	101
Labourers	106
Carpet manufacture	65–70
Coal mining	66 †
Cotton textiles	61 ‡
Dock labour	139 §
Electrical—	
Wiremen	93
Unskilled labourers, supply works	103
Engineering—	
Fitters and turners	45
Labourers	76
Furniture making—	
Cabinet makers	88
Upholsterers	92
French polishers	101
Gas works—	
Unskilled labourers	98
Municipal authorities—	
Unskilled labourers	99
Pottery	50–60 ‡
Printing—	
Hand compositors and machine minders	107
Bookbinders and machine rulers	117
Railway service—	
Engine drivers	71 ‖
Ticket collectors	124
Goods porters	133
Road transport—	
Tram drivers	94
One-horse carters	108
Shipbuilding—	
Shipwrights	35
Ship joiners	44
Labourers	68
Shipping (foreign-going ships)—	
Able seamen	90 ¶
Firemen	83 ¶
Wool textiles	80–90 ‡

* England and Wales only.
† Based on average earnings per shift.
‡ Pieceworkers.
§ Based on rates per day.
‖ Excluding mileage allowances, where paid.
¶ Based on rates per month; a reduction has since been agreed upon—see Table in reference section.

It will be seen that the skilled worker in the shipyard has the smallest increase of any of the trades shown, while the ordinary shipyard labourer is only just above the agricultural labourer, in spite of the difference in the nature and conditions of his employment. The sharp line of cleavage between the rates of increase in the competitive trades as compared with the "sheltered" industries is clearly shown, and it is obvious that since the industries which produce the goods we sell (or try to sell) abroad must in the long run bear the cost of the non-competitive trades, there is a call for an immediate and drastic revision of wages as between industry and industry, before we can hope to compete successfully in the world's markets.

Nor is the non-competitive burden confined to carrying the sheltered trades; Government and local taxation has increased to a colossal extent, and expenditure is being maintained at a figure wholly unjustifiable when viewed from the point of view of the nation's trade balance sheet. The national budget has grown from under 200 million pounds sterling to 800 millions, and apart altogether from interest on war debts, and payments for war pensions, our national expenditure is still more than double the pre-war figure. The exporting industries alone have ultimately to provide for this expenditure, and it would be well if every room in Whitehall (and its environs, for our spending departments have spread far beyond the pre-war limits) had as its motto the homely but forceful saying that "You cannot take more out of the till than goes into it."

Furthermore, the want of State control over local taxation has resulted in an almost intolerable burden upon the producing industries. Assessments by parish councils, town councils, and county councils in Scotland, for instance, have by 1924 increased to nearly 130 per cent. of the 1914 figure; and there appears to be a policy on the part of local authorities to avoid popular outcry against such a huge increase by putting up the levy upon industrial establishments disproportionately as compared with private dwellings. It was stated some time ago that the combined assessable rental of eleven shipbuilding firms in the Glasgow district had gone up from £49,867 in 1914–15 to £103,850 in 1923–24—an increase of over 108 per cent. The total amount paid for local taxation alone (municipal, poor, and education) was £17,658 in 1914–15, as compared with £61,036 in 1923–24—345·5 per cent. increase! One company alone had an increase of over twelve thousand pounds, which it was stated would be sufficient to provide a return of 5 per cent. on the ordinary share capital of the company. As much as £4,000 out of the total cost of an ordinary cargo ship to-day, or 10*s.* per ton deadweight, may be due to local rates and income taxes.

It is obvious from the foregoing that the most careful scrutiny of every possible avenue of economy must be made, if Britain is to retain her position in the world shipbuilding market; the disputes which have so frequently reduced output and increased costs must be avoided; wages, which are now largely absorbed by the skilled workmen, must be more equitably distributed. But the industry has been passing through so prolonged a period of trial that the

internal possibilities of economy are limited, apart from the fact that the general capacity of the shipyard plant of this country is still too great, and ultimately must be reduced. It is the matters not within the immediate control of the industry itself which cry aloud for consideration. The cost of coal and steel, which is alarmingly high, and will not be improved by the recent coal crisis; the prices of machinery and auxiliary appliances, which are quite out of proportion to the hull costs; the inequality of wages in competitive and non-competitive trades; the incidence and extent of taxation; all these must receive prompt and serious investigation, if the British shipbuilding industry is to survive the lean years which still inevitably await us.

The United States of America.

Elsewhere in this issue of the "Annual" there appears an informative article, from an abler pen,* on the condition of shipping in the United States of America. But a survey of the world's merchant fleet would not be complete without a brief record of the past year's events in America. In other years the writer has commented on the colossal programme of shipbuilding undertaken by the United States on her entry into the war; on the national ambition which carried forward that programme even after the sudden end of the war had shown it to be unnecessary; and on the persistent attempts of American politicians to find some means of clinging to that much-advertised "national merchant marine" which had already been so costly.

The melancholy duty remains of showing that out of a fleet of roughly 11½ million tons of seagoing merchant vessels, 4¼ millions—over 26 per cent.—is laid up, at an estimated cost of over 7¼ million dollars per annum, and of the remaining Government-owned ships Mr. Leigh C. Palmer, the late President of the United States Shipping Board Emergency Fleet Corporation, can only say, "After a careful analysis . . . we feel that the loss per voyage of the Government-owned cargo fleet can be reduced to about 8,500 dollars. . . . This, however, does not include interest and depreciation charges . . . these two items would increase the prospective voyage loss to about 13,500 dollars." (It is to be observed that Mr. Palmer's statement leaves it open whether insurance is included or not.) On the six big liners operated as the "United States Lines," there was last year a loss of 1,600,000 dollars, the loss on the Leviathan alone being in the neighbourhood of a million dollars. Small wonder is it that at last definite proposals are being put forward to rid the United States Government of such an incubus. It is welcome news, not only to the American people, but to the rest of the maritime countries, that the ubiquitous Henry Ford has been persuaded to purchase 200 of the laid-up vessels, mainly as "scrap." The majority of the tonnage is to be melted down for use in motor-car construction, but it is difficult to see how profit can be made out of the transaction, since

* "The Future of American Shipping," by J. R. Gordon.

SHALLOW-DRAUGHT RIVER STEAMER FUSHUN, FOR SERVICE ON THE UPPER YANGTSE RIVER, CHINA.

(Constructed by John I. Thornycroft & Co., Ltd., Southampton.)

the cost of scrapping ordinary cargo boats in the United States ranges from 10 to 12 dollars per ton of scrap steel recovered, and steel scrap can be purchased for 15 to 16 dollars a ton, leaving, say, 4 dollars a ton for the purchase price of the ships and overhead charges. Before the Ford purchase, the Shipping Board had rejected a tender of 1,370,000 dollars for the purchase for scrap of 200 vessels of a total tonnage of 817,000—nearly 1¾ dollars a ton gross, or, say, 4 dollars per ton of steel; presumably the Ford figure was appreciably above this.

It is to be hoped that this purchase, and the subsequent scrapping of the boats concerned, will accelerate the inevitable end of the American experiment in Government ownership of shipping. The war taught us many lessons; not the least of these is the utter folly of State ownership. It was recently estimated that excluding interest on capital, depreciation and insurance, the direct loss to the United States was already £34,000,000, to Australia £11,000,000, Canada £6,225,000, and France £3,500,000 by reason of their State shipping ventures. One by one they have reluctantly been obliged to cut their loss, and to go out of the ownership business. It is to be hoped that the coming year will see a yet more vigorous effort on the part of the United States. For even the most prosperous country of the world cannot afford to continue such losses indefinitely.

Germany.

Writing in the "Annual" a year ago, the author commented on the then apparently favourable condition of Germany's shipbuilding industry, and said: "Germany must face increasing taxation, and is already facing serious labour difficulties, while a very pessimistic view is taken, especially in Dutch banking circles, of the financial position of German shipping firms. . . . Increased difficulty is to be expected in obtaining new capital, owing to the loss of private savings during the inflation period." This prophecy, if it may be dignified by the term, might stand as a picture of the conditions which have obtained in Germany over the past year. On the one hand there are strenuous efforts to obtain foreign orders, while on the other hand there has been a very general shortage of capital and lack of credit. The extraordinarily low figure quoted by the Deutsche Werft for the five British motorships, and the loan of £1,000,000 at 9 per cent. for 10 years by an English financial group, make interesting reading when placed side by side, and are hardly indicative of stable finance. This is due largely to Germany's greater realization of her foreign obligations, and to consequent exceedingly heavy internal taxation; in one instance it is reported that the taxes on a shipbuilding yard had multiplied nearly 15½ times, as compared with pre-war, even when calculated in gold marks.

Symptomatic of the harassing conditions in that country is the closing down of the Reiherstieg Schiffswerft, one of the oldest of Germany's shipyards. This yard was closely connected with the Hapag, Hamburg South America, Woermann and German East

Africa Lines, and also with the Mannheim Motor Works, and yet could not find any help in its difficulties.

Still more significant is the rapid disintegration of the Stinnes group, when the controlling personality has died.

At the beginning of this year, some anxiety was expressed in this country owing to the announcement that there was to be a Government loan in aid of German shipbuilding. This loan was duly arranged, but when details were published it was found that a total of 50,000,000 marks (roughly £250,000) was to be set aside to be lent to shipowners for the purchase of ships to be built in German yards. This money was for loan at ½ per cent. during the building of the ship, rising to 6 per cent. two years after her completion. The shipowner had, however, to find an equal amount, the money only being paid out on presentation of shipyard bills, and then only up to 50 per cent. of the amount which had to be paid. The remaining money would have to be obtained in the open money market, at rates from 10 to 14 per cent., and while it is surely better than elaborate unemployment doles, it is hardly anticipated that much improvement of the German shipbuilding position will result therefrom. The inevitable conclusion is that while certain of the newer and better equipped yards may be able to compete successfully in the international market, yet with no orders to be hoped for from the German shipping industry, which is itself in very low financial water, a very painful process of reorganization must be the lot of the shipyards of Germany as a whole during the next few months.

France.

The past year has been one of severe depression, too, as regards the French shipping companies. After a considerable decline in the number of larger vessels laid up, in the early months of 1924, there has been a progressive increase, which has assumed serious proportions since the re-enforcement of the eight-hour day on merchant vessels. Further, the greatly-increasing depreciation of the French currency has introduced further difficulties, since British coal has to be paid for in sterling, as have also instalments owing to British shipbuilders on new ships ordered when the currency was nearly at par. The shipping companies are therefore not in a position to order anything more than the most urgent of replacements, and the shipyards are in an equally depressed condition. Some relief was furnished during the early days of the currency depreciation by France's ability to underquote, and foreign orders have been a feature of the French shipbuilding position. The force of this movement is, however, now largely expended, and, as in other countries, the outlook is gloomy in the extreme.

Holland.

The shipbuilding industry in the Netherlands presents a slightly better picture than in its immediate neighbours, chiefly owing to better labour conditions, and—even more important in these days

of financial stringency—to the prosperous state of the Dutch banks. Mortgages on ships while under construction are readily obtainable; in some measure this is a reflex of the distrust which the Dutch banks have in regard to the German shipping industry, which borrowed extensively from Holland in pre-war days.

But Holland is not immune from the general inflation of capacity which took place during the war, and in fact is one of our principal competitors to-day; competition is most severe, and contracts are being accepted at a loss, to keep the organizations together. The resumption of more settled internal conditions has resulted in a revival of the Rhine traffic, and yards which build craft for that service are doing well.

Italy.

The one country which appears to be enjoying anything like prosperity in shipping and shipbuilding is Italy. Whereas in 1922 about one-third of her merchant fleet was laid up, by July 1st of this year the amount was only 262,000 gross tons. In addition, the fleet had increased from roughly 1½ million tons of steam and motor tonnage in 1914 to 3¾ millions at June of this year. Further, at the end of June, 1925, there were no less than 39 vessels, of 212,798 gross tons, under construction in Italian yards, while during the quarter then ended she commenced the construction of the largest amount of tonnage of any country outside the United Kingdom, *i.e.* 61,080 tons. It is difficult to say, however, how long this movement can continue, since it is largely based on the elaborate system of subsidies encouraged by that country; judging from similar experiments, the effect of such encouragement is only of use for a very limited time.

Japan.

The year 1924–25 has been curiously prosperous for the Japanese shipping industry, and quite the reverse for the shipbuilders. During 1924 the shipping companies purchased no less than 70 foreign-built steamers, of a tonnage of 238,058. Of these, 50 had been built in Great Britain. Most of them were constructed during the war, and were acquired at bargain prices. For instance, seven vessels sold by the Commonwealth Shipping Board only fetched an aggregate of about £162,000. A Bill was introduced this year for the construction of four Diesel-engined liners of 17,000 gross tons, for the Hongkong-San Francisco run. An appropriation for the construction of these ships and for a Government subsidy for their operation has been included in the Japanese budget for the year 1925–26.

On the other hand, only 73,000 gross tons of merchant shipping were launched from Japanese yards during 1924, and observers in that country have declared that the shipbuilding industry there is doomed. High wages, increased necessity for supervision, the importation of materials from abroad, coupled with high overhead charges and high rates of interest on capital, are said to be forcing

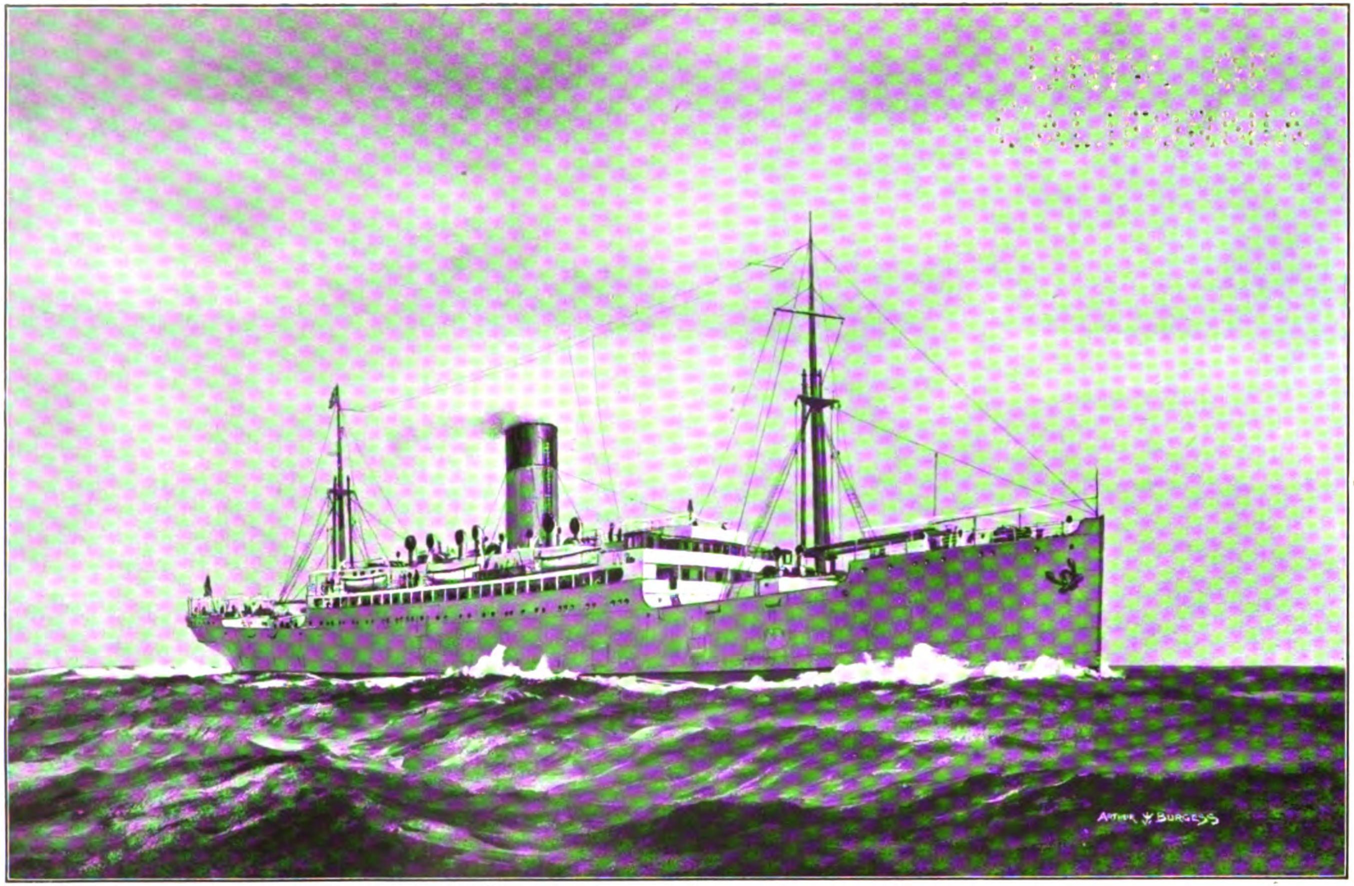
shipyards to look for more remunerative work, and the prophecy is made that soon bridge and railway work will absorb most of the shipbuilding establishments, which it is declared are now shipyards in name only.

Conclusion.

The foregoing is a hasty and cursory review of conditions during the year 1924–25 in the world's merchant fleet and in its attendant shipbuilding industry. But while many aspects of the situation have necessarily been ignored, owing to the limitations of space and time, the writer has attempted to hold the balance fair, and not to stress unduly any particular feature. The result must be admitted to make extremely gloomy reading; there is scarcely an instance of real prosperity, and in the main it is a record of contracts either lost or accepted without profit, of ships laid up or run at a loss.

The world's merchant fleet as a whole needs a drastic pruning of its unfruitful limbs, and the grafting on of more economical branches; the shipbuilding fields which are "played out" must be discarded, and intensive culture must be studied with concentration and energy. Not until this is done will there be any return to a proper state of efficiency; and since "Civilization is Transportation," not until this is done can the onward march of Humanity resume its arrested progress.

Westcott Abell.



(From a drawing by Arthur J. W. Burgess.)

ELDERS AND FYFFES PASSENGER AND FRUIT CARRYING STEAMER CARARE.

(Constructed by Cammell, Laird & Co., Ltd.)

CHAPTER II.

The Freight Failure of 1925.

The post-war depression in shipping began in 1921 and during 1925 it became worse than ever. In 1923, this review was headed " The Limit of Freight Depression," and it seemed then that the limit had been reached. The year 1924, however, revealed no improvement of the position, while 1925, starting with the promise of betterment, has been the most bitter disappointment of all, freights reaching pre-war level, while working costs remained 85 to 90 per cent. above the pre-war standard. For five long years shipowners have fought a losing fight against excessive tonnage, restricted trade, and declining freights, hoping against hope that better times would come, only to find at the end that the last state is worse than the first, leaving them in mid-year with no alternative but to lay up tonnage on an extensive scale until remunerative employment offers. Thus it has been reserved for this year of 1925 to mark zero point in a depression which for its length and severity has had no equal in the history of steam shipping.

The chief factors which have produced this discouraging state of things have been :

(1) A further increase in the world's excess of tonnage ;
(2) Restricted international trade owing to the limited purchasing power of Europe ;
(3) A heavy reduction in the quantity of British coal to be carried overseas ;
(4) The failure of the grain movement from overseas to Europe.

Though the Ruhr difficulty is now over and the nations of Europe are making progress with their economic reconstruction, international trade has failed to develop on the lines anticipated, and the United Kingdom, which has made such heroic sacrifices to recover its financial status, is suffering more than any other from industrial depression and unemployment. It is undoubted that the volume of international trade has increased a little, despite disheartening checks and fluctuations ; it is even true that the shipping traffic to and from Great Britain shows some expansion, though that is mainly due to our heavier imports of food and manufactured goods ; but generally, there appears to be less rather than more employment for shipping.

TABLE I.—REPRESENTATIVE BRITISH IMPORTS AND EXPORTS FOR HALF-YEAR ENDING JUNE, 1925.

IMPORTS.

	1st Half-year, 1925.	1st Half-year, 1924.	Increase or decrease.
Animals—			
Cattle for food	329,407	436,521	— 107,114
Sheep and lambs for food	156,382	223,849	— 67,467
Beef, cwts.	6,931,329	6,705,522	+ 225,807
Corn—			
Wheat, cwts.	46,796,021	52,134,726	— 5,348,705
Wheat flour, cwts.	4,770,224	5,429,763	— 659,539
Barley, cwts.	4,603,338	8,417,933	— 3,814,595
Oats, cwts.	3,567,872	5,802,936	— 2,235,064
Maize, cwts.	8,910,365	11,752,738	— 2,842,373
Cotton, raw (except linters), centals	8,751,656	5,590,312	+ 3,161,344
Oil, crude petroleum, gallons	266,299,386	189,589,135	+76,710,251
Iron and steel, tons	1,396,182	1,171,621	+ 224,561
Rice, cwts.	1,984,834	2,004,222	— 19,388
Sugar, refined, cwts.	6,852,636	6,278,021	+ 574,615
" raw, cwts.	13,835,445	13,578,672	+ 256,773
Tea, lbs.	206,230,518	202,482,496	+ 3,748,022
Wool, sheep or lambs', centals	4,647,540	5,187,770	— 540,230
Timber (soft) and pitwood, loads	2,941,597	2,726,839	+ 214,758

EXPORTS.

	1st Half-year, 1925.	1st Half-year, 1924.	Increase or decrease.
Coal, tons	25,848,443	31,131,057	— 5,282,614
Cotton yarn and twist, lbs.	96,815,500	87,486,600	+ 9,328,900
Cotton piece goods, sq. yds.	347,053,800	316,828,900	+ 30,224,900
Iron and steel, tons	1,831,556	2,024,549	— 192,993
Jute yarn, lbs.	26,429,200	21,250,400	+ 5,178,800
Jute piece goods, sq. yds.	96,645,800	82,072,000	+ 14,573,800
Linen piece goods, sq. yds.	49,506,800	60,428,800	— 10,922,000
Sodium compounds, cwts.	4,829,251	4,900,411	— 71,160
Wool, sheep or lambs', centals	229,945	290,836	— 60,891
Woollen and worsted yarn, lbs.	19,839,900	23,028,800	— 3,188,900
Woollen tissues, sq. yds.	66,517,900	75,503,000	— 8,985,100

Coal and Grain Movements.

To find the cause of this apparent anomaly, we must look a little deeper into trade factors and tendencies. During the first half of 1925, there was a signal failure in the two most important branches of the shipping trade, viz. in grain freights homewards from the great producing countries and in coal freights outwards from Great Britain. Grain and coal have always been the controlling factors in the freight markets, and the extent of the import into Europe of the one and of the export from Great Britain of the other, has always determined the general state of the ocean carrying trade. In the past year, the demand alike for grain and for coal has proved to be sadly disappointing, and in both cases for the same reason—high prices. Unfortunately, too, it is not only coal which has failed in our export business. All classes of manufactured goods have experienced a disappointing demand abroad, mainly for the reason that British products could not compete with the products of cheaper labour, lower standard of living, and the depreciated exchanges of European competitors. This country has, indeed, fallen a victim to the cheaply produced manufactures of the Continent and has imported iron and steel, machinery, motor cars, textiles, silks, and other valuable manufactured goods greatly in excess of previous years, with the result that the adverse balance of trade for the first half of the year reached the alarming figure of £207,448,498, as compared with £209,094,739 for all 1924, and £135,853,457 for 1923.

The statement on p. 160 shows the character of our import and export trade for the half-year ending June 30, as compared with the same half of the previous year.

It will be noted that we have imported rather less animal food and much less grain, more cotton, less wool, more petroleum, more iron and steel, more timber, more sugar and tea, and that we have exported less coal, less iron and steel, and chemical products, less linen and woollen manufactures, but more cotton and jute goods. In the imports, the reduced quantities of grain are probably the heaviest item, and in the exports, the reduced quantity of coal.

Reduced Coal Shipments.

The reduction in coal exports alone is sufficient to influence the clearances from our ports during the period in question, and in point of fact, while the total entries of shipping have increased satisfactorily, the clearances with cargoes have diminished, and that compared with 1923, the decrease is alarming, as will be seen from the following statement :—

	Total entrances.	Total clearances.
	Tons.	Tons.
Half-year ending June, 1925 . . .	24,821,904	28,539,684
Per cent. British tonnage . .	66·2	63·1
Half-year ending June, 1924 . . .	23,596,456	29,425,972
Per cent. British tonnage . .	64·4	60·3
Half-year ending June, 1923 . . .	22,995,473	33,924,227
Per cent. British tonnage . .	64·0	57·8

TABLE II.—COAL EXPORTS DECLINE.

	January to June.	January to December.
	Tons.	Tons.
1925 . . .	25,843,443	—
1924 . . .	31,131,057	61,651,273
1923 . . .	39,808,881	79,459,469

The half-year's coal exports tell a discouraging tale of shrinkage and decline. The total quantity of cargo coal sent abroad during the six months was only 25,843,443 tons, which registers a decline of 5,287,614 tons compared with the first half of 1924, and of 13,965,438 tons compared with the same period of 1923. Consequently, in 1925 we exported only at the rate of some 52 million tons per annum as against 61 million tons last year, and nearly 80 million tons in 1923, and representing a falling off of over 20 million tons a year as compared with pre-war volume. With so much less coal to be carried, and with tonnage in the mass exceeding by 16 million tons that which existed before the war, is it a matter for surprise that outward coal freights have sunk to pre-war level ?

CHANGED DIRECTION OF COAL TRADE.

But the trouble from a shipowner's point of view is not only that there has been so much less coal to carry, but that the direction of the trade has also changed. Roughly speaking, it may be said that Europe, and particularly Germany, France, Belgium, and Italy, continues to take less British coal, while Russia as a market is negligible, that country, indeed, now being a competitor of Great Britain in the Mediterranean, supplying coal from the Donetz basin. The result is that in the main, British coal has had to be carried further afield and the old short sea trades, which used to employ so much collier tonnage, have suffered so much that a federation of owners has been formed and a laying-up scheme on a large scale has been under consideration. The countries which have taken increased quantities of British coal, it will be seen from the following table, are situated further afield and employ vessels of the larger class, which take coal freight outwards in preference to ballast, to help them with their freight homewards. But the coal business has become so limited that shipowners require to be much more alert than formerly in moving their vessels and finding markets. Europe is of less account to British shipowners than it used to be. Now, the best markets are further overseas and involve longer voyages and, often, long trips in ballast. Then, even in the more distant markets, to which more coal might be sent, business has been restricted by a sharp rise in coal freights, following a like fall in grain freights home. This was notably the case in the Argentine trade, when in May and June coal freights rose to 20*s*. a ton owing to the utter collapse of grain freights from the River Plate.

TABLE III.—DESTINATION OF BRITISH COAL SHIPMENTS.

Destination.	Six months ending June, 1925.	Six months ending June, 1924.	Increase or decrease.
	Tons.	Tons.	Tons.
Russia	4,001	29,549	− 25,548
Finland	146,581	154,266	− 7,685
Sweden	1,169,564	1,542,856	− 373,292
Norway	935,387	860,236	+ 75,151
Denmark	1,209,029	1,673,245	− 464,216
Germany	1,835,581	3,926,042	−2,090,461
Netherlands	703,105	1,603,340	− 900,235
Belgium	1,544,284	1,631,840	− 87,556
France	5,655,020	7,678,686	−2,023,666
Portugal, Azores and Madeira	504,509	557,162	− 53,653
Spain and Canaries	1,166,391	1,138,019	+ 28,372
Italy	3,599,025	3,113,157	+ 485,868
Greece	289,261	277,029	+ 12,232
Algeria	625,884	687,107	− 61,223
French West Africa	43,121	54,785	− 11,664
Portuguese West Africa	112,340	100,223	+ 12,117
United States	34,627	54,999	− 20,372
Chile	44,445	32,361	+ 12,084
Brazil	446,092	439,358	+ 6,734
Uruguay	195,102	205,593	− 10,491
Argentine Republic	1,410,136	1,553,205	− 143,069
Irish Free State	1,141,799	1,216,302	− 74,503
Channel Islands	104,088	99,235	+ 4,853
Gibraltar	290,239	312,563	− 22,324
Malta	125,304	189,141	− 63,837
Egypt	1,063,657	834,053	+ 229,604
Aden and Dependencies	38,755	44,026	− 5,271
British India	66,821	55,499	+ 11,322
Ceylon	81,163	79,979	+ 1,184
Canada	224,671	101,050	+ 123,621
Other countries	1,039,461	886,151	+ 153,310
Total coal	25,848,442	31,131,057	−5,282,614

THE FALL IN FREIGHT RATES.

TABLE IV.—AVERAGE FREIGHTS.

(*a*) Cardiff.

Ports.	1914.		1921.		1922.		1923.		1924.		Jan. to June 1925.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
River Plate	14	1½	18	0	15	6	16	0	13	4½	15	3¾
Alexandria	10	3	21	0	14	6	11	9	12	0	7	10½
Genoa	8	10½	16	3	12	4½	11	7½	10	4½	9	0
Barcelona	9	1¾	17	4½	14	2	14	9	12	3	11	9
Gibraltar	7	11½	11	3	9	3	8	9	8	9	7	3½
Lisbon	6	2¼	12	7½	10	10½	10	4½	9	3	8	9
Bilbao	5	4¾	9	10½	9	0	7	10½	9	0	7	6
Rouen	6	3¼	7	10½	6	9	6	9¾	5	3	4	3
Havre	5	1½	7	3	6	4½	6	7½	5	0	4	1½
Dieppe	4	4	7	9	6	7½	6	6¾	4	9¾	4	1½

(*b*) Tyne.

Ports.	1914.		1921.		1922.		1923.		1924.		Jan. to June, 1925.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Port Said .	11	1¾	15	4	14	2¾	11	3	10	11¼	9	11¼
Alexandria .	8	3½	16	11	15	2	11	10	11	5	10	4½
Genoa . .	9	10	15	10½	12	0½	10	3	9	10	9	0
Marseilles .	9	5¼	15	3	12	2	10	9½	10	1½	8	9¾
Barcelona .	10	0½	16	8	14	8¼	12	11	12	5½	11	10½
Carthagena	9	5¼	14	10	14	6¾	13	6	11	5¼	11	9
St. Nazaire .	6	9½	9	3	7	4½	6	4	5	7	6	4½
Bordeaux .	7	2½	8	11	7	6	6	8½	5	10	4	11¼
London .	3	10½	6	6	4	3	4	1½	3	5	3	8¼
Rouen . .	6	8	7	5½	6	2½	5	6½	4	4½	4	1½

How coal freights have been affected by this unusual state of things may be seen from the above tables of average rates paid from Cardiff and the Tyne to representative ports during the half-year compared with the four years previous and with 1914. It will be noted that with the exception of the River Plate and some of the Bay ports, all the rates are considerably below the averages for last year and most of them are also below the averages for 1914.

Depressed Grain Demand.

Grain, even more than coal, has been responsible for accentuating the depression in freights. In the year 1924, harvests in Europe were all much below the average, and in Russia particularly, the crops failed to such an extent that grain and flour had to be imported. This year, 1925, opened with a general shortage in Europe which promised heavy drafts upon the great granaries of Canada, the United States, Argentina, South Africa, and Australia. There was every prospect that grain-carrying tonnage in these trades would be in demand, and after a brief spurt in chartering from Australia some activity was reasonably anticipated in the spring. But, unfortunately, the shortage set the wheat speculators to work, especially in America, and prices ran up to unreasonably high figures. The unexpected happened: Europe stopped buying—could not, indeed, afford to buy at the prices. A slump followed and the Canadian season opened with only a poor demand, while business from the United States failed in the most disappointing fashion. Rates of freight fell steadily. Hopes were entertained, however, that by the time the Argentine harvests were ready for shipment, the grain-buying movement would of necessity reassert itself. But the Argentine shippers also thought to profit from the shortage in Europe and held out for high prices until they were left with heavy stocks on their hands, and the slump in grain freights from the River Plate which ensued in May–June–July will become historic. Shipowners, whose one hope seemed to lie in that trade, directed a steady stream of tonnage into the River Plate during these months, not a little of it unfixed, only to find the demand sinking and freights

falling to unheard-of figures, as low as 11*s*. to 12*s*. in June–July. Of course, grain freights in all the other markets were sympathetically affected, and fell to correspondingly low figures, the extent of the decline being shown in the following table recording the highest and lowest rates paid for each month from January to July :—

HIGHEST AND LOWEST MONTHLY GRAIN FREIGHTS FROM JANUARY TO JULY.

	Jan.	Feb.	March.	April.	May.	June.	July.
Grain :	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*
Montreal to U.K. or Continent	—	—	—	3 0 2 10½	3 1½ 2 9	2 0	2 7½
Gulf Ports do.	4 9	5 0	3 4½ 3 3	3 3	—	3 7½	—
San Lorenzo do.	27 0 24 0	22 0 20 0	19 0 14 6	16 3 15 0	18 6 15 0	16 6 11 0	20 0 12 6
North Pacific do.	—	40 0 37 6	38 9	—	34 0	34 0 31 3	35 0 30 0
Australia do.	55 0 42 6	52 6 43 9	47 0 37 0	39 0 33 9	36 3 30 0	32 6 27 6	—
Danube do.	17 0 16 6	19 0	17 6 16 0	17 0 15 0	17 6 16 0	17 6 17 0	17 0 12 6

OTHER HOMEWARD MARKETS.

Of the homeward markets, it may be said that they were all influenced by the slump in grain freights and, almost without exception, fell below the 1924 averages, though in the main they kept above the level of 1914. Sugar found a certain amount of employment for tonnage in the Cuban trade, but at declining rates as the season advanced. Nitrate freights, on the whole, were a little better, but were unfavourably influenced by diversions of tonnage from the River Plate. Ore freights, naturally, in view of the extreme depression in the iron and steel trades, ruled very low, and even wood freights from the Baltic, in spite of the good demand for sawn woods for house building at home and on the Continent, declined as the season progressed, while pit prop and pitwood freights declined sharply under the influence of the depression in the coal trade and the closing down of so many collieries. Cotton freights from Alexandria were unusually dull. Even tanker freights succumbed to the growing output of tanker tonnage, notwithstanding Europe's heavy imports of crude oil and petroleum products, much of which, however, especially to Great Britain, is carried in the tanker fleets of the great oil corporations. Considered as a whole, the steadiest markets in the homeward trade were the Eastern, which were not flooded with tonnage to the same extent as the Western markets. There was, however, a fall in these markets also, and at times business was stagnant, but the decline in rates was not so pronounced as in the Western grain freights.

The following table shows the average rates for representative voyages recorded for the years 1921 to 1925 inclusive :—

TABLE V.—AVERAGE RATES FOR VOYAGES.

	1921.		1922.		1923.		1924.		1925, Jan. to June.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Calcutta to U.K., Cont., per ton d.w.	25	0	22	1½	27	7¾	30	1	—	
Karachi do. do.	28	4	24	10	25	7	23	8½	23	6
Rice Ports do. do.	34	2	27	10	29	8¼	32	8¾	26	3
Bombay do. do.	24	10	22	3	26	2¾	26	1¾	22	6
Northern Range (grain) do. per qr.	5	0	3	7½	3	1½	3	7½	2	0
Montreal do. do.	5	4½	3	9¾	3	5¼	3	10½	2	6¾
Gulf Ports do. do.	6	11¼	17 c. (per 100 lbs.)		16¼ c. (per 100 lbs.)		4	3	4	1½
River Plate (San Lorenzo) do. per ton	45	1	27	7	23	4½	25	9¾	19	0
River Plate (Lower Ports) do. do.	38	8	26	6	20	0	23	9¼	16	3
Danube do. do.	34	10½	19	3	19	0	17	0	15	9
Australia do. do.	66	3	43	9	37	6	39	0	41	3
Nitrate to U.K., Cont., per ton	57	6	34	10½	32	3	28	3	23	6
Bilbao to Middlesbrough, ore, per ton	8	3	7	10	7	9	6	8	6	1½
Benisaf to U.K., Cont., per ton	8	6	7	1	7	2¼	7	5	6	6
Bordeaux to Bristol Channel, per ton	10	3	10	3	9	10½	9	3	8	5¼
Gulf Ports (timber) to U.K., Cont., per std.	195	0	145	0	125	0	150	0	125	0
Lower Gulf to E.C., (Baltic timber) per std.	61	10	47	6	45	3½	41	0	41	0
Archangel to E.C., per std.	—		62	6	64	10	62	6½	57	1½

CHAMBER OF SHIPPING AVERAGES.

In the light of the above freight records, it follows that the geometrical averages of the Chamber of Shipping show a corresponding fall. This fall is apparent in the following table, showing the averages from July, 1924, to August, 1925, for the leading trade routes, and over all routes, as well as for time charters. It will be seen that the averages for June were appreciably below those for 1913 in the Red Sea and Arabia, the Argentine, the United States, and Canadian markets, only the European trade being above that average, while the average over all for that month at 23·7 compares with 23·4 for 1913, being only 0·3 higher :—

	European waters.	Red Sea and Arabia.	Argentine, Uruguay, etc.	United States.	Canada to United Kingdom.	All routes.	Time charters.
Average over 1913	24·4	23·3	19·6	23·6	24·8	23·4	—
August, 1924	29·1	27·0	25·9	28·6	28·6	27·8	20·9
September, 1924	28·9	27·4	26·2	25·4	36·1	28·3	21·7
October, 1924	29·5	28·5	26·4	34·7	36·1	30·1	24·9
November, 1924	29·4	28·7	24·3	32·2	35·0	29·3	24·7
December, 1924	29·8	28·9	24·8	25·2	—	28·2	23·9
January, 1925	30·1	31·1	25·5	30·2	36·1	30·0	25·4
February, 1925	30·2	30·3	21·1	32·5	—	28·8	24·3
March, 1925	30·1	25·2	17·6	27·7	—	26·1	23·9
April, 1925	29·7	24·5	16·9	26·2	27·1	25·3	22·4
May, 1925	28·1	20·7	17·8	27·8	26·3	24·3	20·9
June, 1925	27·6	18·9	13·2	20·2	18·0	23·7	20·9
July, 1925	28·2	18·4	15·1	29·8	23·7	22·1	20·2
August, 1925	27·4	23·4	17·8	22·7	22·6	23·6	20·5
September, 1925	27·1	25·8	14·1	23·6	27·1	23·3	21·2

The following statement shows how the quantity of laid-up tonnage fluctuated with the course of the freight index number, declining in the first two months after the rise in the averages at the turn of the year, and then increasing sharply as the averages fell to the low figures of May–June–July :—

TABLE VI.—FREIGHTS AND IDLE PASSAGES.

1925.	Freight Index Numbers.	Laid-up tonnage.
January . . .	30·0	488,252 net tons
February . .	28·8	—
March . . .	26·1	—
April . . .	25·3	393,062 „
May	24·3	—
June . . .	23·7	—
July	22·1	777,179 „
August . . .	23·6	—

PROMISE OF IMPROVEMENT.

When the stage of acute depression was reached in June–July, it was realized that things were so bad that they could not be worse. That, fortunately, proved to be the case. The second half of the year opened more favourably than the first. With the advent of early autumn, the deferred grain-buying movement was resumed, Europe being on the whole a little better circumstanced financially and more settled politically. As a result, grain freights recovered somewhat. The Montreal season finished up fairly well. The North Pacific trade developed a little activity as the year progressed. River Plate freights rose from their absurdly low level. A good deal of tonnage found charters in the Black Sea grain trade after the harvests had been cut and exports resumed. A bumper maize crop in South Africa and record shipments drew tonnage into that quarter on a larger scale than usual, helping to swell the volume of employment. Tanker freights, too, improved in the later months of the year. Then, in the outward trade, the Government subvention to the collieries and miners' strikes in America led to a gradual expansion in coal exports, and coal-carrying tonnage found a little better employment as the year advanced, though, for the most part, at low rates. The improvement was, of course, only relative.

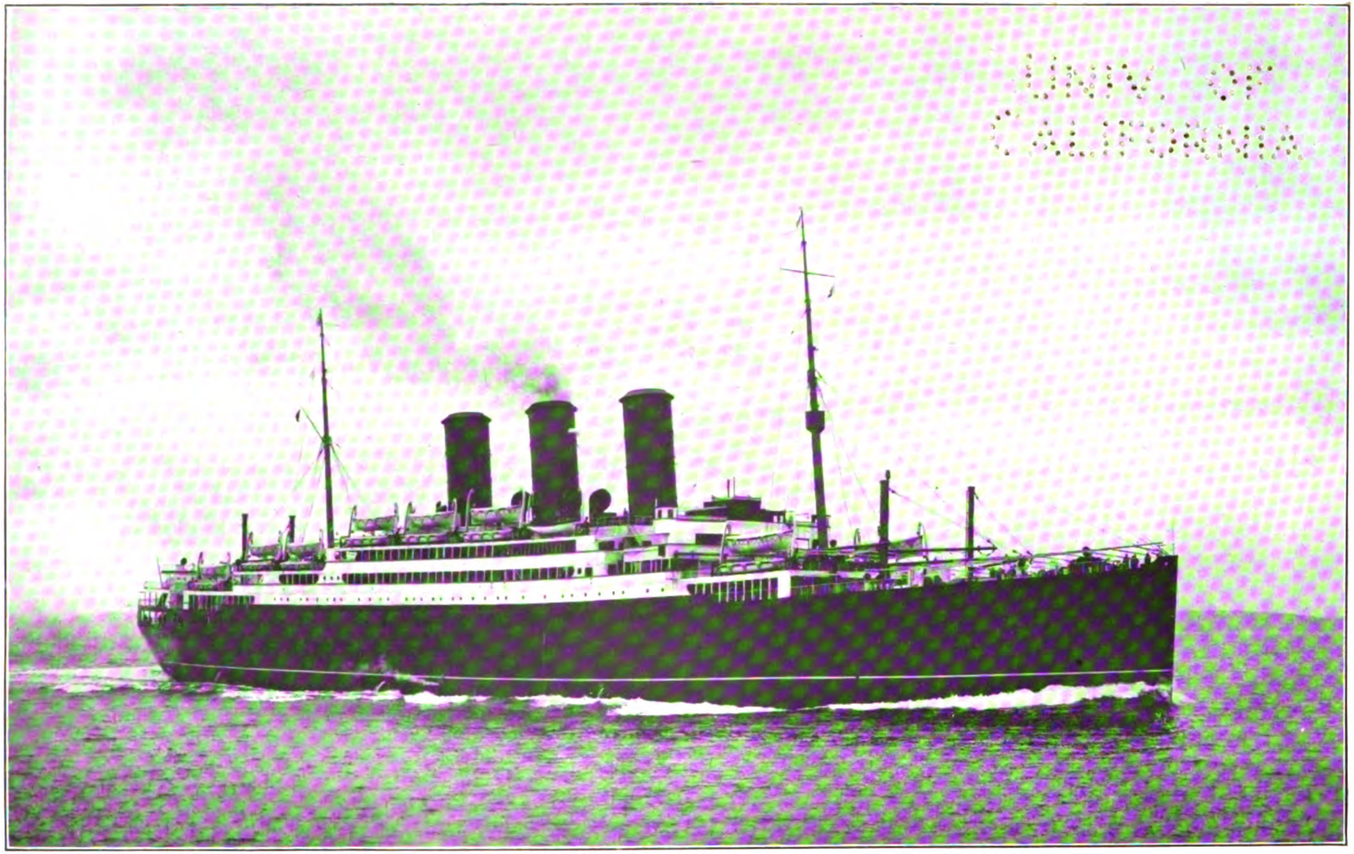
Shipping has been, and still is, living on its reserves, as Sir Frederick Lewis put it at the annual meeting of Furness, Withy & Co., Ltd., and it cannot go on doing so. Admittedly, there can be no real improvement in freights until the long looked for revival in international trade sets in. But that revival is now overdue. It failed to eventuate in 1925, but 1926 must surely not again bring disappointment. Hope now is centred in that year, which holds some promise of better things.

Meantime, operating costs have been coming down gradually from their high level. Bunker coal has been cheaper and fuel oil should follow in the downward direction soon, prices in 1925 having

been so high as to be a burden to motorship owners, and to cause a considerable reversion from oil to coal burning steamers. Wages on British ships have been reduced, and stores are, on the whole, cheaper. Severe competition from the Continent has operated to bring down repairing and dry docking charges, and the cost of new tonnage has also been reduced. Insurance charges show little change. All these costs, however, are still greatly above pre-war level. Dock and port dues, especially at the home ports, are still unduly high, and so are loading and discharging rates, while it need not be insisted that taxation at home and abroad is a heavy item to owners struggling to pay their way.

Further adjustment must be effected between the supply and demand for tonnage and between freights and working costs before shipowners can be in a position to command a fair return on the capital invested in the industry. But it may at least be suggested that the turning point has been passed and a start made on the upward curve.

R. W. Johnson.



(*Photo: Maclure, Macdonald & Co.*)

T.S.S. CALEDONIA FOR THE ANCHOR LINE (HENDERSON BROTHERS), GLASGOW.

(*Constructed by Alexander Stephen & Sons, Ltd., Govan, Glasgow.*)

CHAPTER III.

The Standing of the World's Merchant Fleets.

In spite of the breaking up of 1,174,000 tons and the uneconomic level of freights, there has been an increase of steam and motor tonnage. The world's effective carrying capacity is apparently to that extent greater than it was a year ago, but, as in former post-war years, allowance must be made for war-built ships—especially under the American flag—which, owing to defective design or hasty workmanship, will probably not again be employed at sea. But, nevertheless, there is more efficient tonnage afloat now than at any previous period, as the appended figures reveal:—

Table I.—Tonnage of the World.

Year.	Steam.		Sail.		Total.	
	No.	Tons.	No.	Tons.	No.	Tons.
1891	11,705	13,816,509	20,522	9,096,244	32,277	22,912,753
1900	15,898	22,369,358	11,942	6,588,000	27,840	28,957,358
1914	24,444	45,403,877	6,392	3,685,675	30,836	49,089,552
1915	24,508	45,729,208	6,212	3,532,561	30,720	49,261,769
1916	24,132	45,247,724	6,035	3,435,412	30,167	48,683,136
1919	24,386	47,897,407	4,869	3,021,866	29,255	50,919,273
1920	26,513	53,904,688	5,082	3,409,377	31,595	57,314,065
1921	28,433	58,846,325	4,773	3,128,328	33,206	61,974,653
1922	29,255	61,342,952	4,680	3,027,834	33,935	64,370,786
1923	29,246	62,335,373	4,261	2,830,865	33,507	65,166,238
1924	29,024	61,514,140	3,932	2,509,427	32,956	64,023,567
1925	29,205	62,380,376	3,711	2,261,042	32,916	64,641,418

The sail tonnage, it will be seen, continues to decrease steadily from year to year, and now is little more than one-third of what it was in the opening years of the present century. The present percentage in relation to steam and motor ships is only 3·6. Of this sail tonnage, 1,105,000 tons—equal to nearly 49 per cent. of the total tonnage—are now owned in the United States, and the other countries which still have an appreciable amount of this type of tonnage are: France, 192,000 tons; Great Britain and Ireland, 136,000 tons; Canada, 106,000 tons; and Italy, 98,000 tons. Lloyd's Register points out, moreover, that if barges, which are generally towed, and other craft included in the sailing tonnage because not fitted with engines for self-propulsion, be excluded, the world tonnage of *real* sailing vessels only amounts to about 1,611,000 tons, of which 659,000 tons—equal to about 41 per cent. of the total—are owned in the United States.

Cargo Tonnage Available.

From the crude statistics of world tonnage, deductions must be made to arrive at an estimate of the amount available for the carriage of passengers and goods. An attempt to calculate this restricted amount of shipping is made in Table II. :—

Table II.—Tonnage Available for carrying Goods.

	Gross tons.	Gross tons.
Total tonnage of the world	—	64,641,567
Sailing ships	2,261,042	
Oil tankers (excluding vessels of less than 1,000 tons)	5,177,630	
Oil tankers (less than 1,000 tons) .	50,000	
Trawlers and other fishing vessels .	796,369	
Tugs and salvage vessels * . . .	349,000	
Steam barges, dredgers, etc.* . .	312,000	
Paddle steamers *	340,000	
Lake vessels, United States † . .	2,276,839	
Lake vessels, Canada †	258,452	11,821,332
Tonnage available for passenger and goods transport . .		52,820,235

Table III. shows that foreign maritime countries, which have revealed the most activity in adding to their fleet since the conclusion of the war, have still further added to their tonnage, with the exception of the United States and Spain. Japan, France, Germany, Italy, Holland, Norway, Sweden, Denmark, and Greece all possess a greater volume of steel and iron tonnage than at the end of June, 1924. Whereas a year ago the surplus of tonnage as compared with the amount available on the eve of the war was 15,016,000 gross tons, now the excess amounts to 16,271,000.

Table III.—Sea-going Steel and Iron Steamers and Motorships owned by the Principal Maritime Countries.

Country.	June, 1924.	June, 1925.	Difference between 1925 and 1914.
		Tons gross.	Tons gross.
Great Britain and Ireland . . .	18,917,000	19,274,000	+ 397,000
British Dominions	2,213,000	2,230,000	+ 823,000
America (United States) . .	11,823,000	11,605,000	+9,768,000
Japan	3,655,000	3,741,000	+2,099,000
France	3,193,000	3,262,000	+1,344,000
Germany	2,856,000	2,993,000	−2,105,000
Italy	2,676,000	2,894,000	+1,466,000
Holland	2,533,000	2,585,000	+1,114,000
Norway	2,326,000	2,555,000	+ 632,000
Sweden	1,146,000	1,215,000	+ 223,000
Spain.	1,163,000	1,120,000	+ 237,000
Denmark	974,000	1,008,000	+ 240,000
Greece	751,000	890,000	+ 70,000
Belgium	555,000	538,000	+ 197,000
Other countries	2,749,000	2,875,000	+ 818,000
Total abroad	38,613,000	39,511,000	+15,874,000
World's total	57,530,000	58,785,000	+16,271,000

* Estimate excluding such vessels operating on the Great Lakes of America, which are included below.

† Steam and motor vessels only; sailing vessels are included in the general total given above.

In 1914 the United Kingdom owned nearly 44½ per cent. of the world's sea-going steel and iron steam tonnage; the present percentage is under 33. The United States occupies now second place with 11,605,000 tons—equal to nearly 20 per cent.

Obviously the figures in Table III. do not take into consideration the question of the efficiency of the various Merchant Navies, as in addition to such factors as size, age, type, and speed of the vessels, other circumstances, which do not lend themselves to a statistical analysis, would have to be taken into account.

Of the tonnage owned in Great Britain and Ireland 25½ per cent. is less than five years old. The Merchant Navies which have the largest proportion of new tonnage (less than five years old), are as follows: Germany, 50·6 per cent.; Holland, 33½ per cent.; France, 27 per cent.; Denmark, 26·7 per cent.; and Norway, 24 per cent.

The group of vessels which form the largest tonnage is that of between 4,000 and 6,000 tons each, amounting to 17,768,634 tons, equal to 28½ per cent. of the world's total steam and motor tonnage, while the big liners, say those of 15,000 tons each and upwards, only represent 3·4 per cent. of such total tonnage.

Coal and Oil.

Largely owing to the progress of construction of motorships, oil continues to displace coal for the purposes of sea transport, as the appended statement indicates:—

	1914. % of total gross tonnage.	1925. % of total gross tonnage.
Sailing vessels and sea-going barges	8·06	3·50
Oil, etc., in internal combustion engines	0·45	4·20
Oil fuel for boilers	2·65	27·54
Coal	88·84	64·76
	100·00	100·00

Only 64¾ per cent. of the tonnage of the Merchant Marine now depends entirely upon coal, while in 1914 the percentage was nearly 89.

There are now 1,404 steamers of 9,100,274 tons fitted with turbine engines and 2,145 vessels (including auxiliary vessels) of 2,714,073 tons fitted with internal combustion engines, as compared with 730,000 tons and 220,000 tons respectively in 1914. While during the last 12 months the tonnage of steamers fitted with reciprocating steam engines actually decreased by about 152,000 tons, there was an increase of 738,000 tons in the tonnage of motorships and of 305,000 tons in the tonnage of vessels fitted with steam turbines.

Vessels representing a total tonnage of 440,000 tons are fitted with a combination of steam turbines and reciprocating engines. In the case of 36 vessels, with a tonnage of 110,000 tons, a comparatively new system of propulsion has been adopted, viz.: electric motors connected to the screw shaft, these motors being supplied with current from generators which are driven either by steam turbines or oil engines.

Progress of the Motorship.

The progress which the motorship continues to make is reflected in Table IV.

Table IV.—Motorships of 100 Tons Gross and Upwards.

Countries where owned.	1923.		1924.		1925.	
	No.	Tons.	No.	Tons.	No.	Tons.
British Empire:						
Great Britain and Ireland	139	374,873	173	507,251	220	733,734
Dominions	34	14,084	58	17,659	69	37,272
U.S.A.:						
Sea	97	139,786	119	190,658	128	215,961
Northern lakes	5	5,200	6	17,200	6	13,826
Philippine Islands	4	3,179	5	1,045	4	928
Belgium	—	—	2	7,568	2	7,217
Brazil	2	3,852	4	6,547	5	6,992
Denmark	40	132,542	47	167,763	56	171,964
France	34	27,958	27	25,892	27	34,824
Germany	45	84,528	61	113,555	78	233,612
Greece	5	1,202	3	889	4	1,601
Holland	52	66,577	55	69,450	64	124,262
Italy	34	61,374	33	73,165	41	124,901
Japan	20	4,375	26	6,718	42	41,376
Norway	130	177,071	126	192,002	156	324,567
Spain	8	13,378	15	16,800	17	18,442
Sweden	103	173,697	117	195,960	120	259,900
Other countries or country not stated	62	37,455	76	44,424	77	51,691
Total	824	1,321,131	953	1,654,546	1,116	2,403,070

Tonnage Broken up.

The increase in tonnage during the past year is all the more remarkable in view of the accelerated rate at which tonnage has been broken up. The figures have varied greatly from year to year. During the period 1905–1909 the minimum was 120,003 tons, and the maximum 251,900 tons; during 1910–1914 the variation was from 87,737 tons to 245,891 tons. During the years 1915–1920, owing to the influence of the war, practically no tonnage was broken up, the yearly average only amounting to 10,000 tons. During 1921 the tonnage broken up amounted to 77,500 tons; it increased to 315,000 tons for 1922, and to 963,000 tons for 1923, and for the year 1924 the total reached 1,174,000 tons. In addition to ships broken up allowance must be made for vessels wrecked. Table V. shows the number and tonnage of ships of all nationalities lost, broken up, etc., during the last ten years:—

TABLE V.—SHIPS LOST, BROKEN UP, ETC.

Year.	Steamers and Motorships.		Sailing Ships.	
	No.	Tons (gross).	No.	Tons (net).
1915	992	1,893,718	316	223,398
1916	1,288	2,724,041	511	284,224
1917	2,605	6,607,261	748	520,206
1918	1,294	3,332,791	325	159,919
1919	425	524,172	241	112,658
1920	370	518,595	215	138,959 (gross)
1921	344	536,537	215	137,720 (gross)
1922	511	743,866	205	143,946 (gross)
1923	709	1,456,870	259	259,909 (gross)
1924	777	1,614,662	239	243,017 (gross)

WAR LOSSES INCLUDED IN THE ABOVE TABLE.

Year.	Steamers and Motorships.		Sailing ships.	
	No.	Tons (gross).	No.	Tons (net).
1915	659	1,380,657	67	57,516
1916	942	2,189,079	245	139,609
1917	2,211	5,957,913	523	392,449
1918	911	2,674,428	141	69,744

In view of the excess of tonnage to the requirements of oversea trade, the outlook for shipbuilding and shipping is still overcast, but the fleets which are faring worst are those which are under Government control and are casting heavy burdens on the respective taxpayers.

THE EDITORS.

CHAPTER IV.

Cross-Channel Steamers.

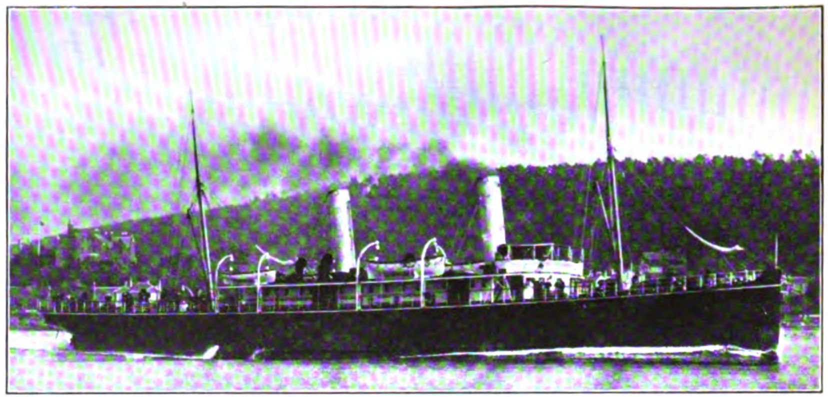
An indication of the important place which Channel steamers occupy in the Mercantile Marine is supplied by the fact that over 70 per cent. of the vessels of 20 knots speed and above belong to this class. The development in type as regards speed, size, safety, and comfort has been one of the outstanding features in the history of shipping; and a comparison of the earlier vessels of the class with those now being built for the service demonstrates the remarkable expansion which has taken place.

The function of Channel steamers is to provide fast, safe, and comfortable transit between ports separated by sheltered or semi-sheltered waters, and from the very nature of their work they are built of lighter scantlings than ocean-going steamers. The demand of the public that the sea passage shall be as short as possible has necessitated higher speeds than is practicable on longer routes, while the number of persons carried in relation to size is very great compared with other types of passenger ships. These requirements have resulted in the production of the special type known as the Channel steamer.

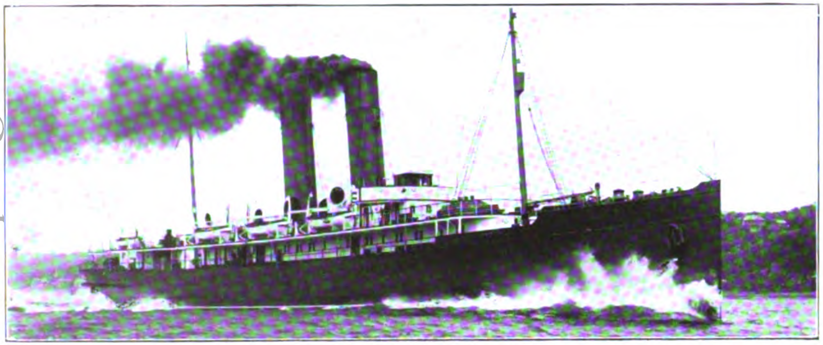
Thirty-five years ago the Channel steamer was different in many respects from what it is to-day. The accommodation then consisted of a few cabins and large open spaces packed with sleeping berths; a dining saloon placed aft, usually about the level of the water-line or in a small deckhouse, and perhaps a small smoking-room, placed on the upper deck, comprised the public rooms. The standard of accommodation, especially in vessels engaged in night journeys, was of the most rudimentary kind; the number of lifeboats and life-saving appliances was hopelessly inadequate, judged by present-day standards, and the design and arrangements of the vessel were made out on a scale to meet the minimum requirements of the travelling public. The Channel steamers of this period were designed to carry a good deal of general cargo, and on some routes a fair number of cattle, while the fuel, it is almost unnecessary to state, was exclusively coal.

In the modern Channel steamer, the standard of accommodation has advanced enormously, open berth spaces being deleted as far as possible except in vessels which are used alternately for night and day service. In vessels intended for night service only, the staterooms are fitted up for one, two, or four persons, and are furnished with modern travel conveniences. In later vessels, four-berth rooms

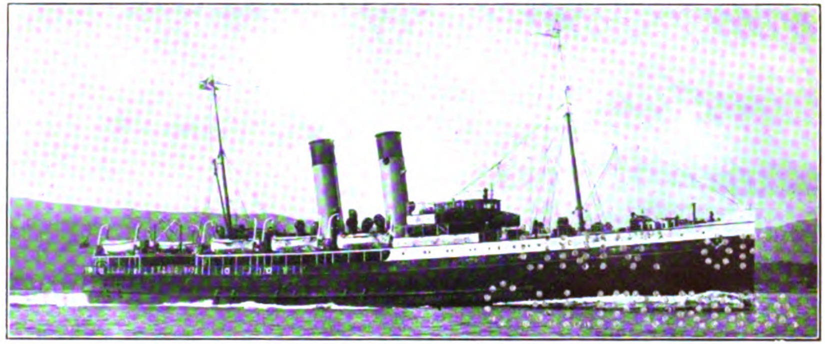
LONDON AND SOUTH WESTERN RAILWAY STEAMER LYDIA.
(*Constructed in 1890 by J. & G. Thomson, Ltd., Glasgow.*)



LONDON AND SOUTH WESTERN RAILWAY STEAMER COLUMBIA.
(*Constructed in 1894 by J. & G. Thomson, Ltd , Glasgow.*)



FISHGUARD AND ROSSLARE RAILWAY AND HARBOUR CO.'S S.S. ST. PATRICK.
(*Constructed in 1906 by John Brown & Co., Clydebank.*)



LONDON AND NORTH EASTERN RAILWAY STEAMER BRUGES.
(*Constructed in 1920 by John Brown & Co., Clydebank.*)

NOTABLE CHANNEL STEAMERS OF DIFFERENT EPOCHS.

have either been entirely abolished or greatly reduced in number, the desire for greater privacy which has found expression in liner design being now met on vessels in the shorter journey services. The great advance in the extent and decoration of public rooms in liners has also extended to vessels of the cross-channel type, and the spaces which are specially set apart as public rooms, such as dining saloon or restaurant, library, smoking-room, and ladies' room are well-appointed and luxuriously furnished and reserved entirely for their own special uses. In conjunction with this development in type and expanse of public rooms, provision has also been made for extensive promenading space, where passengers can obtain exercise and recreation even in severe weather, since protection is afforded, on some portions of the promenading space, by portable screens and special sliding windows.

Increase of Safety.

Such improvements, since they are concerned with the architecture and comfort of the living spaces, are generally evident to the travelling public, but other features which are not so evident show an equal improvement on earlier practice. It is possible that in earlier days, questions of initial cost and running expenses, as affected by tonnage dues, etc., adversely affected questions of subdivision, and as a result, the number and height of watertight bulkheads left much to be desired, while the provision of fireproof bulkheads was practically unknown. Since the publication of the Bulkhead Committee's report, the owners of cross-channel steamers have sought to comply to the fullest extent with the recommendations contained therein, and notwithstanding the additional cost entailed, have provided every safety device recommended or suggested. The fulfilment of these requirements has resulted in appreciable modifications to the designs of modern vessels so as to enable them to carry the increased weights resulting from the greater number of bulkheads, the heavier scantlings, and the provision of additional life-saving appliances in the form of extra lifeboats and buoyant apparatus. To meet this increase of weight it has been found necessary to modify the dimensions by increasing the length and beam where limitations of draught are encountered and the necessity of providing sufficient stability has resulted in a reconsideration of the beam-length ratio. Generally, in this class of vessel with limited draught, it has been necessary to carry the bulkheads up to the main deck only, thus simplifying the general arrangement above the bulkhead deck. In other cases where deeper draught has been used, the bulkheads have been run up to the shelter of promenade deck; but even with this addition it is generally possible to evolve a suitable arrangement while the standard of subdivision is materially improved. It should be observed that usually in vessels over 300 feet in length the two-compartment standard of subdivision is maintained throughout, and this has resulted in vastly improved ships so far as safety and seaworthiness are concerned. The London and North Eastern Railway Company's vessels

Antwerp, Bruges, and Malines are typical cross-channel steamers of the post-war type which have embodied in their arrangements the latest safety requirements carried out on the fullest scale.

Development of Speed.

The question of speed is dominated largely by the particular route which a vessel serves, and may be from 17 knots to about 24 knots, although the majority of ships are driven at around 19 knots. Vessels on a short daylight service are naturally required to develop higher speeds than those operating on a night service, where nothing is to be gained by arrival at a terminal port at an early hour, although a notable exception to this is the Holyhead and Kingston service of the London Midland and Scottish Railway Company, where the speed of the vessels on the night service is very high in order to suit the late hour of departure from London and the early train service in Ireland. In the higher speed vessels we now find that watertube boilers are coming more into favour, while the cylindrical boiler still holds its own on the longer passage steamers. Geared turbines, having firmly established their reliability, are now superseding the reciprocating engine and show considerable advantage in fuel consumption over the older type, while the saving of weight and space is also appreciable. On the Home Trade routes, coal is still used as fuel, chiefly because it is more easily obtained at the embarkation ports; within the last few years, however, several companies have made arrangements for the delivery and stowage of oil at their depôts and have installed oil fuel burning apparatus in their latest vessels. By its adoption, with the reduced load required to be carried, it is possible to cut down the dimensions of vessels restricted for draught, thus saving in tonnage dues, which form a considerable item in the running expenses. From the point of view of raising and maintaining steam pressures, the advantages of oil as compared with coal fuel are most marked, while the reduction of the *personnel* is also an important factor. These economies suggest that the adoption of oil fuel in Channel steamers is a step in the right direction, and likely to be followed in all new vessels of the class.

Variation of Types.

Channel steamers may be divided into three types: (1) those built for day service; (2) those built for night service; and (3) those built for running day or night. All three types differ considerably in design and arrangement, the main features of the day service steamers being the number and size of the public rooms and the expanse of the promenading spaces. As many as ten public rooms have been provided in some two-class vessels, and in addition to the open promenades, long stretches of covered promenades with sliding glass windows are generally arranged so as to give the necessary protection in bad weather. Illustrative of this type are the vessels of the Liverpool and North Wales Steamship Company and the latest ships on the Liverpool to Isle of Man run, which have large

SOUTHERN RAILWAY COMPANY'S CROSS CHANNEL STEAMER ISLE OF THANET.
(Constructed by William Denny & Bros., Dumbarton.)

saloons and all the facilities for catering on an extensive scale for a large number of passengers.

In steamers designed for night service the spaces below the promenade deck are generally given over to sleeping accommodation. It is in this class of vessel that improvement has been most evident in recent years, particularly in those engaged exclusively on night traffic ; where it has now been found advisable to grade the rooms on varied fares and introduce a few cabins-de-luxe with private bathrooms attached. The proportion of single berth rooms is also increasing, and the tendency seems now to be to make up the first-class accommodation exclusively of one- and two-berth cabins, with additional special rooms. In these vessels, too, the public rooms, although perhaps not on the same spacious scale as on the daylight service steamers, have been developed in comfort and architecture to provide more attractive social centres for the passengers.

The design of Channel steamers is governed also by the time normally taken and the average weather conditions on the particular route in which the vessels are to be engaged. In the recently constructed vessels—Isle of Thanet and Maid of Kent—for the Dover-Calais service of the Southern Railway Co., covered-in spaces of generous proportions have been arranged so as to permit the majority of the passengers to have comfortable seating accommodation during the comparatively short sea trip. Although this departure from previous practice has involved a curtailment of the open promenading spaces usually associated with vessels of the type, the exposed nature of the route warrants the appropriation of a portion of these spaces for this purpose.

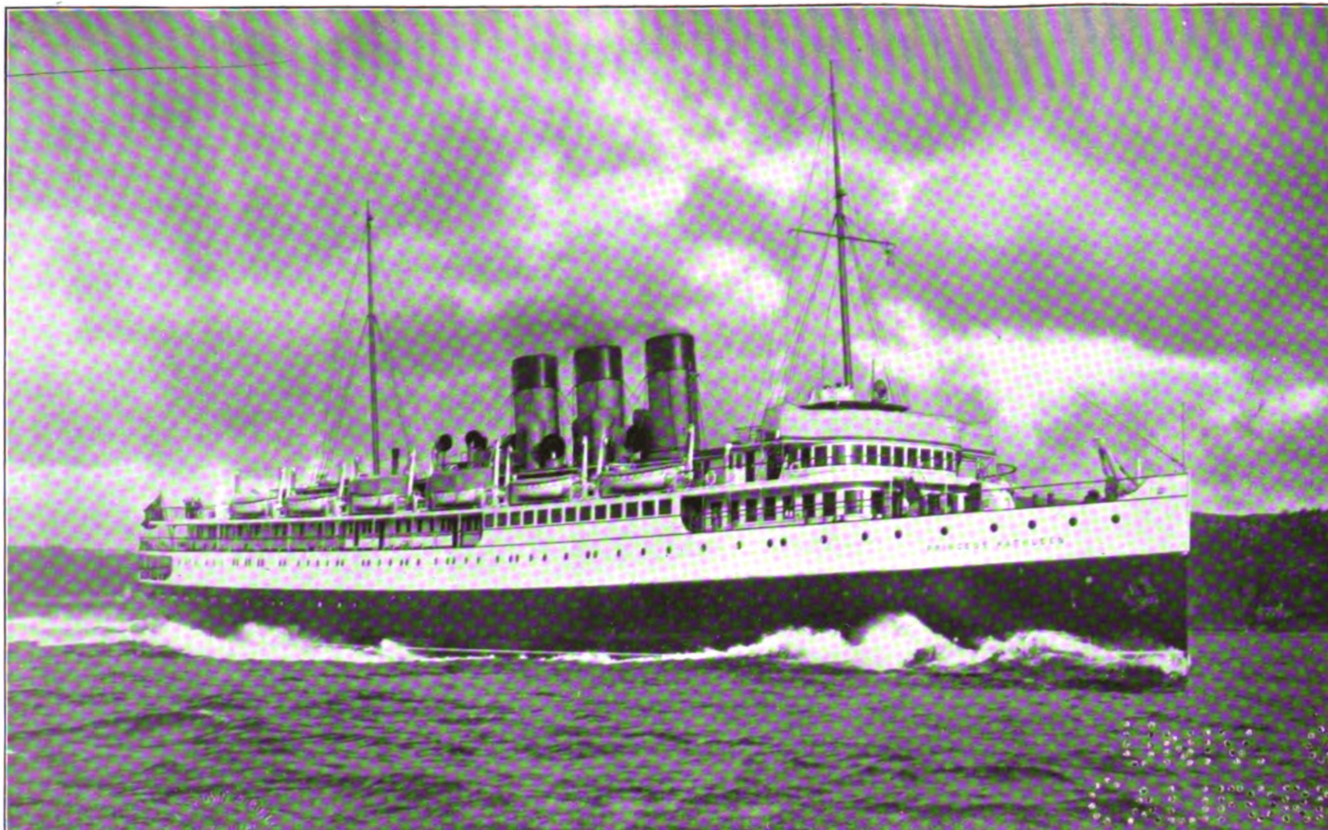
Although there is a great deal to record of progress in design with these home trade vessels, it is doubtful if the advance has not been made along too stereotyped lines. It is admitted, of course, that the limitations imposed by the size of harbours and the character of the routes has influenced the development of the type, but if such ships be compared with the designs of vessels of the same character operating in North American waters, it will be found that the home trade vessels are well behind the standard that is being set abroad. The argument may be advanced that the volume of traffic in home waters does not warrant such a development, but it is questionable, in some cases, if a radical alteration in design, similar to that which has taken place on the Pacific Coast trade, would not justify itself by an increased volume of traffic, especially as the public has been educated during the years succeeding the war to wider views and higher tastes. In addition, the modern demand for space for recreation and dancing during travel must be satisfied.

Progress in Pacific Vessels.

To illustrate the progress in Channel steamer design on the Pacific Coast, no better types can be cited than the two vessels Princess Kathleen and Princess Marguerite, recently completed by Messrs. John Brown and Company, Limited, for the Canadian Pacific Railway Company on the triangular route Vancouver-Victoria-

Seattle. These two vessels complete the whole journey, about 300 miles, once in 24 hours, leaving Victoria at mid-day and returning from Seattle or Vancouver the following morning, so that they have to carry day traffic on one part and night traffic on the other portion of the journey. The limiting draught is about 17 feet 6 inches, which is only slightly in excess of that of the average home trade vessel. Owing to the extent of the accommodation required and the deadweight to be carried, it was necessary to adopt a breadth of 60 feet on the main deck and 54 feet on the average waterline (15 feet), so that the problem of propulsion for the speed required, viz. 22½ knots with a waterline length of around 350 feet, was not an easy one. As, however, the journey by night was to be done at 16 knots as compared with the higher speed by day, it was found advisable to install six cylindrical and two Yarrow watertube boilers, burning oil fuel, the latter being used only when the higher speed is required.

The plans of these vessels give an idea of the high standard and lay-out of the accommodation. The principal bulkhead deck is the main deck, on which is arranged a large open space for motor-car stowage with a 'tween deck height of 8 feet 9 inches, this space being served by a large gangway door on each side and being available also for freight, if required. The hatches to the cargo spaces below terminate on this deck, so that no interference is caused with the accommodation above, and the larger hold is served by a powerful lift. Sleeping accommodation is provided for over 300 first-class passengers in large airy staterooms, all of which are lighted and ventilated by natural means; the standard of the accommodation is shown by the fact that there are no fewer than 17 large special rooms having private bathrooms and W.C.'s attached, and 22 two-berth cabins on the boat deck, each of which have private W.C.'s and shower baths. All the cabins have washbasins with hot and cold water laid on, and a large number are furnished with cot beds. The public rooms are laid out on the most extensive scale in view of the day traffic requirements and comprise dining saloon on the main deck aft, observation-room on the promenade deck forward, and smoking-room aft; the library is on the boat deck, and there is a veranda aft. The entertainment and recreation of the passengers are catered for by the provision of two large spaces on the shelter deck, with special floors laid for dancing, these have proved a most popular feature of the design. It is obvious, however, that the incorporation of such a large number of public rooms was only made possible by the great beam of the vessel in relation to her length, but in addition to this a considerable metacentric height was obtained for all conditions of lading, as this was essential for the embarkation of cars through the gangway doors on the main deck. Other features of the design are the extent of the promenading spaces provided on the boat, promenade, and shelter decks, and the relation of the boat positions to the public rooms, so that the view of the passengers will not be obstructed. The full complement of passengers carried on the day service is about 1380.



CANADIAN PACIFIC RAILWAY COMPANY'S STEAMER PRINCESS KATHLEEN.

(*Constructed by John Brown & Co., Ltd., Clydebank.*)

SMOKING ROOM.

DINING SALOON.
C.P.R. MAIL AND PASSENGER STEAMER PRINCESS KATHLEEN.

The "Complete Type" of Steamer.

It may be said that the Princess Kathleen represents the complete type of Channel steamer as regards ability to deal with day and night traffic, and at the same time carry a considerable quantity of cargo. To a certain extent, this is only practicable on account of the fact that the dimensions are not so restricted as in vessels operating in home waters. In the routes to the Channel Islands, for instance, it has been found advisable in the fast passenger vessels to reduce the cargo-carrying capacity to a minimum, in order to follow out the development in the standard of passenger accommodation. For the cargo traffic, special cargo steamers have been designed and built to deal with this independently, only the mails and special cargo being carried by the passenger vessels. This practice has also been followed by some of the companies operating across the English Channel and the North Sea, and is due, in most cases, to the lack of facilities at ports on the other side. This division of traffic has had a beneficial result on the designs of the passenger vessels by effecting a reduction in the number of hatches, by eliminating the winches required for handling heavy cargo and leaving available the lower 'tween-deck space entirely for accommodation. The reduction in deadweight and displacement has been used in most cases to obtain higher speed and more suitable subdivision by the adoption of a lighter draught; in some cases where the draught has been adhered to, the possible increase in dimensions has been utilized for improvement in the extent and standard of the accommodation.

The Factors of Safety and Comfort.

The problem of seaworthiness in vessels of this class is one which has practically solved itself by the process of evolution of the type, and the record of Channel steamers regarding freedom from serious casualties has been a very happy one, especially within recent years. The question of a steamer's seaworthiness, however, extends beyond the measure of safety, and a reputation for excessive pitching or rolling is not desirable. As far as pitching is concerned, the existence of a forecastle with large flare forward is advantageous, as also is fullness in sections above the waterline aft, which serves to minimize the amplitude of the pitch and thus avoid the shipping of seas. As a guard against excessive rolling, the fitting of bilge keels for at least 40 per cent. of the length of the vessel is essential, especially where the metacentric height is not large; and the latter ought never to be less than one foot so as to avoid excessive heeling when the passengers crowd to one side of the vessel when coming into port.

The choice of a desirable metacentric height must necessarily depend on the vertical distribution of weights, especially in light vessels of this nature, and should be increased proportionately to the radius of gyration of the mass of the ship. This is a point which is sometimes overlooked in design as the common conception of stability is based on metacentric height, which is no criterion in itself as to the liability of the vessel to develop "bad rolling"

qualities. The practice of increasing the breadth of the hull above the waterline so as to give flared sides to the deck is also worth considering if the metacentric height is not too greatly reduced by doing so, as increased deck area is thereby obtained and the dynamical stability is greatly increased. If fenders are fitted at the deck immediately above the waterline, care should be taken to pitch these high enough to escape the slamming action of the waves and in some cases the bottom of the fender, if of wood and above 12 inches in breadth, should be cut away at the outer edge to minimize this slamming.

The Rudder Problem.

As regards the steering qualities of vessels which have to turn inside a small diameter, the main consideration is to provide sufficient rudder area in conjunction with a balanced rudder which may be of the spade type or supported by gudgeons. The latter type is favoured on account of its uniformity of working, although the area required may be slightly greater than that of the former. When the spade type is fitted and the vessel has to be navigated up a river or through narrow channels, the deadwood should be carried well aft to reduce the intensive swinging tendency when the helm is put over. In some cases it has been found advisable, in the interest of speed, to sheath the rudder with wood when it is situated behind a broad sternpost, tapering it off to the after end, but the effect on performance of doing this is probably of minor importance. In problems of steering, the effect of the distribution of erections is not usually considered, but for those who have the ship under observation in rough weather, this is a very vital point in keeping a course, and it is not uncommon to find some vessels when on trial making more speed against the wind than with it. In such a case, the distribution of erections and in a less degree the trim of the vessel may appreciably affect the performance. As the tendency in modern cross-channel steamer design is towards adding still further to the erections in order to provide the desired passenger accommodation, it becomes imperative that the effect of these on the steaming, rolling, and steering qualities of vessels of this type should be thoroughly investigated.

Reference may be made, in conclusion, to the machinery fitted in vessels for the cross-channel service. In the meantime geared turbines have established a supremacy over other types of engines and are almost universally adopted. Diesel machinery, which has been widely applied in other types of merchant ships, has not yet been so developed as to meet the requirements regarding power, weight and space which this particular service demands. In this connection it is interesting to note that the Parkeston, a motor-driven channel vessel, has recently been placed on the Harwich-Esberg service, the adoption of Diesel machinery having been made possible by the very moderate speed and power required. For the high speeds normally demanded geared turbines, associated with oil-fired boilers of the cylindrical or watertube type as required, provide an efficient system for propulsion, which, in the opinion of many, has not yet been developed to the fullest extent.

John Black.

GREAT WESTERN RAILWAY TURBINE STEAMER ST. JULIEN FOR THE WEYMOUTH-CHANNEL ISLANDS SERVICE.

(*Constructed by John Brown & Co.*, **Ltd.**, *Clydebank.*)

CHAPTER V.

The Influence of Taxation on Shipbuilding and Shipping.

Not long ago a prominent banker put to me this question, "Do you *really* think high taxation is a factor in the depression of industry?" It was somewhat surprising to receive such a query from such a quarter, but it transpired that behind it lay a theory which was something like this: Since the bulk of taxation which business pays is income tax it follows that in times of depression when no taxable income is received the burden ceases to exist.

Unfortunately this simple theory does not by any means meet the facts of the case. In the first place, it is quite usual for businesses in a particular year to be faced with the necessity of paying sums by way even of income tax alone which more than exhaust their entire revenue in that year. That common experience in businesses, which are necessarily subject to fluctuations in demand, will remain an impediment to industrial progress so long as the Government neglects the advice of the Royal Commission on Income Tax, and adheres to a three-year average basis. But the matter by no means ends there, for the idea that taxation has no effect upon industrial progress has at its heart a fallacy of a deeper kind.

Take the simplest case of a small business man, who merely to maintain the life and efficiency of himself and his family needs £A per annum. If his business is to be kept efficient and is to expand, there must be added to £A a sum £B, perhaps considerably larger than £A itself on account of those charges involved in the changes and developments of business, only the fringe of which is met by the deductions allowed by the authorities for depreciation and the like. If £X is the taxation this man has to meet in any year, it is obvious that he will have to earn from his business £A+£B+£X. If, however, X is, say, doubled, then he will have to earn £A+£B+£2X, and it is problematical whether he can do this, since the higher scale of taxation will have hit his fellow citizens also and rendered them a worse market for his commodities and less capable of paying the enhanced prices which, on the same turnover, he must charge if he is to maintain the essentially necessary £A and £B intact—less able also to absorb any increased production which greater efficiency might secure. So it is this factor £B which suffers first. It is this "fund for the future," this "seed corn of industry," which high taxation in Britain hits so hard to the great public detriment. The development-efficiency of business is lowered, with the natural result that unemployment is aggravated, and there is a general feeling,

not unfounded in regrettable fact, that less heavily taxed countries are outstripping us in the race of Commerce and Industrial Efficiency. So much for the theory that high taxation is not a factor in the depression of industry.

There remains another theory which, although it may be very comforting to any spendthrifts who may still linger within the confines of Government Departments is, it is submitted, equally unsound. That theory, put quite frankly, is that the harder British subjects are taxed, the harder they will have to work and the more efficient they will be. There is no doubt a certain superficial atmosphere of truth about this, but, as a general theory applicable to the present scale of British taxation, it is false to the core. Taxation has long past any imaginary point where it might serve as a stimulant to effort, and any one who has moved at all in active business circles knows that it has reached a stage in Britain where adventure is damped down and enterprise prevented, since, if success follows a new undertaking, the expenditure of Government Departments and of Local Authorities will sweep away by taxation and rating more than half of the income accruing; while if failure follows, as it sometimes must in the path of high industrial endeavour, the entire loss will fall to be carried by the enterprise itself. In considering these attractive theories in favour of high taxation, which appear to have achieved some popularity in certain circles, one is reminded of the well-known phrase of the great French Economist Bastiat, "To rob the people it is necessary to deceive them. To deceive them it is necessary to persuade them that they are being robbed for their own advantage."

We need a revival of the Gladstonian tradition in public finance and a fundamental change in the whole attitude of the Civil Service upon these matters; for magnificent as is the work which these public servants do for the nation, it cannot attain its full measure of usefulness until the fact has burned into their minds that to make a man work six months or more in the year solely to provide money for Government Departments to spend is a system which has knocked out of the business life of Britain the old incentive which built up her prosperity. When that change of mind comes about we shall begin to return, slow though the return must necessarily be, to the days when commercial progress in Britain went hand in hand with public economy. For indeed there is no greater aid that Government can give to Commerce than the scrupulous husbanding of the public resources.

On applying these considerations to the industries particularly affected by "Brassey's Naval and Shipping Annual," it will be seen that nothing is better calculated to promote the prosperity of shipbuilding and shipping, two of our most essential industries, than a reduction of taxation and rates. These levies in combination represent a burden on the industrial production of this country of upwards of £950,000,000. That is a colossal sum, whether it be considered in relation to the size of the population, about 45,000,000, or to the scale of production, which now is probably less than 75 per cent. of what it was immediately preceding the outbreak of the Great

War. Rates and taxes constitute an unescapable levy on the whole community. There is no more fallacious argument than that which suggests that taxation can be progressively increased without injury to the great mass of weekly wage-earners. Whether the money be paid directly by one class of the community or another, in the long run, the load falls on every one in the higher cost of living, if not in other ways. The extent of the burden prompts every one who has to find the large sums which are now demanded to endeavour to pass on some portion of it to others, and to a great degree these efforts are made with success. It is impossible to escape the conclusion that the proportions which our unemployment problem has assumed have been due in no slight degree to the scale upon which central and local authorities have maintained an excessive standard of expenditure. We are the most heavily taxed country in the world, as we also have the largest proportion of the population existing in enforced idleness, constituting, owing to the awakened public conscience, a continuing burden on the rest of the community, not excluding those weekly wage-earners whose good fortune it is to be still in work.

In estimating the burden which taxation places upon industry, there is a tendency to ignore the existence of the rates raised from year to year by the local authorities. There is ground for believing that this charge bears more heavily on production even than the taxation which is imposed for the support of the national services. The rates on coal mines, shipyards, engineering shops, shipping offices, wharves, docks, and other establishments have to be paid whether the businesses earn profits or only incur losses. The rates are, moreover, cumulative in their effect. In the case of a ship, they are levied at every stage of its evolution—in the coal mine where the fuel is recovered for the making of the steel, until at last the vessel is launched, ready for service. The rates increase the cost of carriage by rail of the coal from the mine to the steel works of the steel from the factory to the shipyard. Rail transport has become excessively costly owing, in some measure, to the large sums which have to be paid to the local authorities for the problematical services which they render to industry as distinct from the community generally. It may be that the time is approaching when it may be necessary to review the incidence of local rates on transport and production, since the present methods of valuation conceal from the ratepayers, who are voters, the character of the burden which the cost of local administration casts upon production, raising the price of all goods consumed in this country, and what is more important, the price which must be asked from purchasers of our exports. It frequently happens that the principal ratepayers in an industrial area have no vote and can consequently exercise no direct influence on expenditure.

On the assumption that the rates constitute perhaps as serious a handicap on shipbuilding and shipping, as well as industry generally, as the national taxation, it may be well to deal first with this aspect of the problem. The Ministry of Health recently issued a statement showing that the local authorities are now

collecting a sum of no less than £142,000,000 every year. That was the estimate for the year 1925. As the following table indicates, the increases in assessment which have taken place within the past few years have tended to conceal the magnitude of the local expenditure. It is announced from time to time that the rates in this or that locality have been decreased, but such statements ignore the increased amount which is extracted from the community under the cover of increased assessments, which are to-day almost exactly twice what they were in 1914 :—

	Total receipts from rates.	Per £ of assessable value.		Per head of population.			Percentage increase per £ since 1914.
	£	*s.*	*d.*	£	*s.*	*d.*	
1914	71,276,000	6	8¾	1	18	11	—
1915	73,734,000	6	10½	1	19	11	2
1916	75,851,000	7	0½	2	0	8	5
1917	72,885,000	6	8½	1	18	10	—
1918	75,377,000	6	10¾	2	0	1	2
1919	84,700,000	7	8⅛	2	5	2	15
1920	105,590,000	9	6¾	2	16	4	42
1921	151,865,000	13	7	4	0	11	102
1922	170,872,000	14	7¼	4	10	2	116
1923	157,274,000	13	1¾	4	2	5	95
1924	144,000,000	12	2	3	14	10	81
1925	142,000,000	11	8¾	3	13	11	74

There is a widespread feeling that the local authorities have for some years past been unduly generous in the payments made to their employees, most of whom compare unfavourably in training and skill with the workers in the great export industries. It pays better to-day to sweep a street or collect dust in some localities than to follow some of the skilled crafts in connection with shipbuilding and engineering, which are the basic industries of an island community, while such men are much better off than seamen or miners. It is an amazing fact that the Ministry of Health, in commenting upon the present standard of local taxation, should suggest that under present conditions no further considerable decrease can be effected. "Some local authorities may be able to secure slight reductions in administration, but in view of the present position in regard to unemployment, poor-law relief, and the cost of living, it is doubtful whether any further general decrease in rates will take place in the financial year which has just begun."

The nation has been reminded by many leaders of industry of the injury which is being done by the present scale of expenditure by the local authorities. During a debate last spring in the House of Commons, Mr. Walter Runciman illustrated the movement by instancing a typical works on Teeside where the rates worked out at 1*s.* per ton of steel produced in 1915, and 6*s.* per ton in 1924. Ship repairing in the same yard bore a rate burden before the war of £3,300, or £550 per ship. In 1924 the latter had risen to £4,400 per ship, and if the rate burden on steel were added, an increased rate burden on shipbuilding of £5,300 per ship was revealed. "Neither Holland nor Germany were such fools as to tax and burden their shipyards in the way we did," and he added that "railways and coal mines were in the same plight."

In addressing the shareholders at the last annual meeting of the

Ebbw Vale Steel, Iron and Coal Company, Sir Frederick Mills also referred to the gross extravagance and thoughtless administration which have led to the present high scale of local rating :

> "A few years ago the local rate at Ebbw Vale, in inflated assessments, were no less than 36s. 1d. in the pound; fortunately an intelligent electorate, who for the most part own their own dwellings, thrust out the spendthrifts, and elected responsible persons, who in three years have reduced the rates to 15s. 1d. in the pound, and have found themselves re-elected for their pains. No one can say that the district is worse for their efficient and economical administration of public moneys; I only wish other electorates in our area would follow their example. As it is, the rates paid by your companies during their last financial year amount to no less a sum than £142,922; to that figure must be added £16,716 for the Miners' Betterment Fund; £70,560 for the loss incurred in supplying workmen's coal at below the cost, and £68,281 for National Insurance, a grand total of £298,479, sufficient to pay the Preference dividend and 8 per cent. on the Ordinary shares. It is, indeed, doubtful if industry can for long stand such luxuries in the face of present world conditions. If the new proposals in regard to pensions are carried, an additional sum of at least £20,000 per annum must be added to these burdens."

Lord Invernairn has also in the past few months emphasized the growing injury which the burden of local taxation is imposing upon industry, and suggested that the high rates were due largely to the higher wages being paid to the employees of municipalities who are obviously not subjected to the disadvantages of trade competition. He illustrated his remarks by pointing out that the unskilled labourers employed by municipalities are now paid 30 per cent. more than skilled tradesmen, such men being, moreover, practically assured of employment for fifty-two weeks in the year, while the engineer can hardly find a job, and if he does so, has no security that it will last more than a few weeks or at the most a few months. Lord Invernairn went on to condemn the wages now paid to employees in railway and other similar occupations, contending that they are much too high in comparison with the wages paid to men employed or seeking employment in the vital industries of the country.

> "It must be obvious to any person taking an intelligent view of the situation that, if these vital industries with which we are connected have to survive the severe competition to which they are subjected from abroad, drastic steps must be taken to reduce costs. Longer hours without increased wages are a necessity, but it would be unfair to ask the men employed in these industries alone to agree to longer hours without increased wages without at the same time adjusting the wages and working conditions of those employed in the sheltered trades to which I have just referred. Our foreign competitors are, without exception, working longer hours for less wages, are not subjected to the high taxation and freight charges with which we are faced, and also, without exception, have a protected home market for their manufactures."

Every one associated with the conduct of our great basic industries must be convinced that the existing scale of local taxation is a far more serious factor in the present depression than is generally appreciated. For some years past the tendency of local authorities has been to incur heavy expenditure on a variety of undertakings, which, however desirable on general grounds, were obviously beyond their means, if due regard were paid to the extent to which their rates are collected on industries struggling to pay their way. Moreover, the tendency to embark upon municipal trading has also been disastrous in its results. In many cases such enterprises, as, for instance, the tramway systems of London and other cities, have

resulted in heavy deficiencies, which have had to be met out of the local rates. These developments have, furthermore, created a large class of workers who, by means of the municipal vote, are in a position to exercise influence upon those who are their employers, namely the members of the local authorities. It has become a matter of great difficulty to reduce municipal wages for this reason, with the result that the country now has a large body of privileged workers, for the most part unskilled, who are far better paid, as Lord Invernairn observed, than the craftsmen who are associated with the unsheltered industries which have to meet the full force of competition on the part of workers in other countries, where not only are wages lower and the hours of work longer, but the incidence of local taxation is very much lighter.

If we turn from rates to taxes we obtain a picture of extravagance which is even more impressive. Successive Governments might almost appear to have dealt with questions of national finance on the assumption that this country made a fortune out of the war, whereas, in fact, it had to realize no mean part of its investments overseas and to mortgage its future income. Some months ago the Financial Secretary to the Treasury issued a comparative table of national expenditure in 1913–14 and 1923–24, which is calculated to alarm the most optimistic student of national economics. With the assistance of this table we can form some impression of the rapid rise of national expenditure. The *Financial News* recently reduced all these calculations to a basis facilitating a clear appreciation of the movement which has been in progress :

"The true difference between pre-war public expenditure, it is perhaps hardly necessary to say, and that provided for in the 1925–26 estimates is, however, only arrived at by taking the former on the basis of 1925 prices, and to exhibit the true difference the following table gives, under the main heads of classification, the estimated expenditure for 1914–15; the same expenditure in 1925 equivalents; and, finally, the estimated expenditure of the current year :

		(In 1,000 's of £)	
	Estimates, 1914–15.	Equivalents, 1925.	Estimates, 1925–26.
Consols, fund charges . .	36,636	58,617	391,929
Fighting services . . .	80,395	128,600	120,513
Civil services	57,066	91,321	222,609
Revenue Department . .	30,848	49,356	64,349
Total . .	204,945	327,894	799,400

"The comparison between columns 2 and 3 of the table is interesting. Independently of the rise in Consolidated Fund Charges, due, to the amount of 331·5 millions, to the higher cost of the Debt Service, the comparison shows that the real upward bound in expenditure comes under the headings of Civil Services and Revenue Departments. Civil Services are, on the true comparison, £131,288,000 more expensive. Dealing with their main items in the same manner gives the result appended :

		(In 1,000's of £.)	
	Estimates, 1925–26.	Equivalents, 1914–15.	Estimates, 1925–26.
Old Age Pensions . . .	10,111	16,177	26,794
Education	16,858	26,972	46,916
Health and Unemployment Insurance	6,407	10,091	19,955
Works and buildings . .	3,237	5,179	6,652
Administration	4,796	7,673	8,496
Housing	—	—	9,040
Unemployment grants . .	—	—	3,796
Total . .	41,409	66,092	121,649

BLUE FUNNEL LINER HECTOR (ALFRED HOLT & CO.).
(*Constructed by Scotts' Shipbuilding and Engineering Co., Ltd., Greenock.*)

"As will be seen, the real outlay has, in comparison with the 1914–15 estimates, just about doubled. Adding the £66,026,000 budgeted for this year under the head of war pensions; the £5,120,000 for Civil Service costs in the Middle East and Mandated Territories; and a variety of new minor charges, and the £222,609,000 of this year's Civil Services, the total is readily enough accounted for."

It would be difficult to set out the position more clearly than has been done in this statement.

Figures with regard to taxation based upon population must be accepted with caution; but the figures quoted by the Chancellor of the Exchequer in the spring of last year are illuminating. The people of this country are charged £15 18*s.* per head of the population —man, woman, and child. In France they pay £6 18*s.* per head. In the United States, including the Federal and Imperial taxation—they pay £6 14*s.* per head, and in Italy £3 6*s.* 11*d.* These figures tell their own tale.

There is a tendency among some politicians to regard income tax and super tax solely from the point of view of personalities and individuals, and to conclude that the higher such taxation is screwed up the greater the amount of social justice done. That line of reasoning is unsound. If we take super tax as an illustration, we must at once realize that there is not merely a personal and individual side of that levy, but there is a much broader and national aspect. Super tax may be just as between individuals, but at the same time it undoubtedly dips more deeply into the funds which otherwise would be used almost exclusively for strengthening the basis and expanding the field of industry to the greatest public advantage, than any tax ever devised. This contention may be illustrated by taking the case of a man who has built up, by his own efforts, a great business. The extent of his holding in that business amounts to, possibly, one million pounds. The profits he derives from it, based on a return of 5 per cent., are £50,000 per annum. The State every year comes in and deprives him of £11,194 by way of income tax. But it is not content with that. Next year it returns and makes the same charge, and it also exacts super tax, not only upon what is left, but also upon the amount which the man has never seen, the amount which it has already taken by way of income tax; the super tax amounts to £12,712 10*s.* A total of £23,906 has gone in these taxes. But that is not all; if such a man wishes his business to continue unimpaired after his death, he must provide for death duties, and, to take an average, the annual burden of providing for these death duties will be between £6,000 and £7,000. We thus see that such a man with £50,000 per annum will find that his income has sunk to about £20,000, and he will still have to face the demands of the local taxation authorities and all the other expenses which business men have to meet.

The shipping industry is peculiarly handicapped because it suffers from double taxation owing to the policy adopted in some foreign countries, as well as by overseas parts of the Empire. It would be impossible to overstress the unfairness of taxing in the various countries at whose ports a ship may call, profits made on the high seas or by organizing ability in the home port. In Australia income tax is levied on an assumed profit, taken to be 7½ per cent.

of the freight earned in Australia, with the result that income tax may actually be paid on a portion of a round voyage which results in a loss. It is not merely the direct cost involved in these inequitable expedients which hits the shipowner. Account must be taken of the enormous waste of time, temper, and money involved in preparing returns on a different basis for each country at whose ports a vessel calls, and where taxation is collected. This inequitable arrangement was dealt with in the report of the Imperial Shipping Committee (Cmd. 1979: 1923). It was pointed out that shipowners claim that a tax on certain percentages of receipts is, in effect, not an income tax, but a tax on turnover; it assumes a fixed relation between profits and turnover which does not exist. Moreover, this assumption is made not even in regard to the receipts from a round voyage, but in regard to the takings at a particular port. Shipowners contend that the profits of a vessel can only be determined in relation to the round voyage, anything less being an incomplete transaction. There is no certainty that even a completed voyage will, in any case, show a profit, and the shipowner may therefore have been taxed at one or more points of a voyage which as a whole has involved him in loss. When liners are concerned it is urged that the total business for the year must be taken into account, since trade on most routes is seasonal in its nature and the busy season must be balanced with the slack. "It has been pointed out to us," the report continues, "that where a percentage charge by way of tax is made upon the freight and fares from a given port, that charge becomes almost inevitably a part of the port charges, which charges are always taken into account by a shipowner when comparing the competitive value of the various freights open to him. Such a tax may in fact act as a repellant, reducing the amount of tonnage offering at a given port as compared with other ports, and thus placing the producers who ship through that port at a disadvantage with other producers in the world market."

This system of double taxation has involved the shipping industry in a variety of difficulties in the attempt to satisfy the different tax collectors administering laws which are by no means uniform. It is a cause of endless vexation as well as of expense. But this is a diversion. The main theme to be emphasized is that the present scale of national and local taxation in this country is retarding the recovery of the more essential industries such as coal-mining, engineering, shipbuilding, and shipping. Its influence is incalculable. Commercial recovery is being retarded by the diversion into other channels of resources every penny of which is needed to fertilize the fields of industry. The war has left us with burdens of debt and honour which no nation can repudiate and retain its credit and its good name. But apart from that aspect of the question, there are at least two very disturbing factors. In the first instance, there is the psychic effect of the war and war expenditure upon large bodies of the people who have been taught, by those who ought to have known better, to expect a vastly enhanced condition of comfort and a higher standard of living when, in fact and in truth, our national resources are unable to provide it—much less able than at

any time before. There is also, unfortunately, the psychic effect of the war upon the mentality of certain Government departments. There are certain Government departments whose lavish traditions of inflated expenditure have not yet been entirely replaced by that meticulous scrutiny of every detail which has long since been enforced by hard circumstances upon every prudent business man. Some Government offices, unfortunately, appear still deliberately to over-estimate their requirements with the object of enjoying the luxury of combining a safe margin with slack accounting and faulty administration of detail.

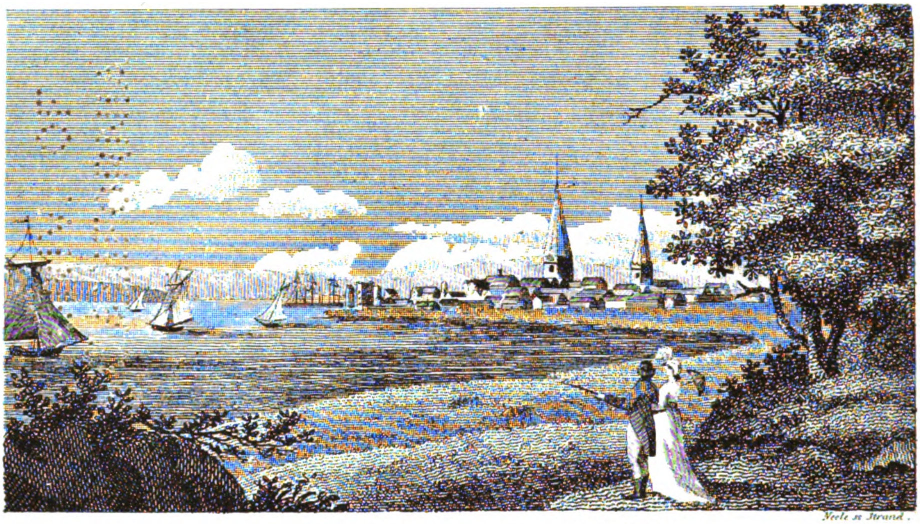
There is a still greater danger which comes from other quarters. There are those who see in the miseries of unemployment a terrible situation which can only be alleviated by the expenditure of ever-increasing sums from the public purse. The amount of unemployment benefit paid in England and Wales from November 11, 1918, to May 31, 1925, was £173,540,000, and in addition, out-of-work donations, amounting to £50,520,000, were paid to ex-Service men and women and to civilians. Such expenditure is no cure for our present troubles. It is at best only a palliative, and a dangerous one, since the strength of Great Britain for the beneficent tasks of peace and, equally, as recent experience has shown, for success and endurance in war, can flow from one source alone—the continued and enhanced prosperity of the industries and commerce upon which her people are engaged ; a return to that prosperity is imperilled by this drain.

Upon the real recovery of British industry from the shocks and dislocation of the war everything else depends, and the paramount task of statesmanship lies not in devising new avenues of expenditure upon social ills which have their root in industrial depression, but rather in taking such action as to make it possible to cure industrial depression itself. A necessary condition of industrial recovery is a lightening of the burdens of taxation. Owing to the peculiarities of our national position, the task of adjusting our industries to the novel requirements of a world where the old economic centres of gravity have shifted to an extent hardly yet realized means more to us than to any other nation. It is a task for which industry requires all its resources.

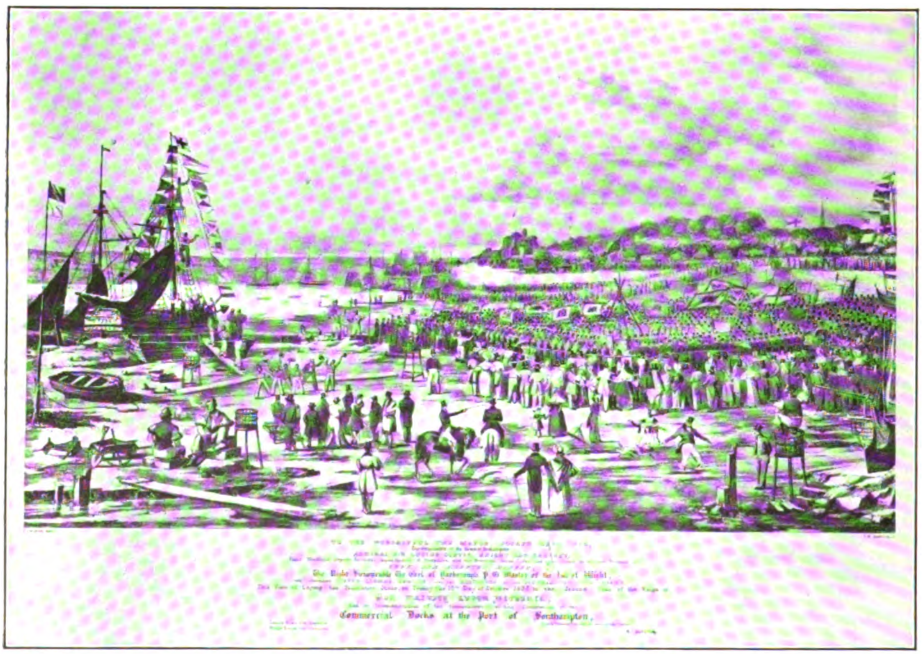
Shipbuilders and shipowners who have passed, and are still passing, through as prolonged hard times as any branch of industry see no reason for despair. They realize that their future depends upon the ability of themselves and of the British people to face and overcome new difficulties, and that if the State and local authorities will give the genius of the race fair play, the present clouds will be dispersed. But effort will be necessary. We who are concerned with sea carriage must keep continually in mind the shipowner who is struggling to keep down the expenses of his business in order to leave a margin for the necessary developments and replacements. He is working in face of fierce competition, sometimes subsidized by foreign Governments, sometimes subsidized by Dominion Governments ; he is attempting, against heavy odds, to keep his ships on the seas and his crews employed with a charter

rate almost on the pre-war level, but every cost on the post-war scale. Nor is the shipbuilder, trying, in the teeth of labour unrest and in the teeth also of Government demands, to save a little to put back into his yard in order to give it a better chance next year, in any more favourable position. It is surely the duty of those who administer national and local funds, and of those who devise Government restrictions and demands, to come to their aid—not indeed by subsidies, but by lightening the heavy load of State and local expenditure and administrative regulations and requirements, which is at present crushing them to the ground.

A. SHAW.



SOUTHAMPTON IN THE YEAR 1803.



LAYING THE FOUNDATION STONE OF SOUTHAMPTON DOCKS,
OCTOBER, 12, 1838.

CHAPTER VI.

THE PORT OF SOUTHAMPTON: ITS PAST, PRESENT, AND FUTURE.

THE ancient seaport of Hamptun, as it was known in the early centuries of the Christian Era, figured early in the history of the British Empire, for it was at Hamptun (Southampton) that the Saxons, under Cedric and Cynric, landed in the year A.D. 495, making there a primitive settlement from which emanated the Kingdom of Wessex, the Realm of England, and ultimately the widespread British Empire. But the real history of Southampton and its water extends much further back than Saxon times, for we may learn from ancient records of the natural beauties of Southampton Water; and its banks are, except for certain commercial developments, very much the same now as they were some three thousand years ago.

During recent excavations in connection with the deep water docks, especially those for the Empress Dock, evidence was obtained that the present Southampton Water was once a valley which formed a common outlet for the rivers Itchen and Test. Through geological changes a subsidence of the valley took place, resulting in the formation of Southampton Water, practically as we know it to-day. Various relics discovered during the excavations included stone tools, weapons, and the remains of a forest; from the nature of these discoveries it is deduced that the valley was, during the Neolithic Age, inhabited by the Ibernian tribes. Many of these relics are exhibited at the Tudor House Museum, Southampton, and the approximate date of the period to which these discoveries relate is considered by geologists to be 1400 B.C., when the Neolithic period came to an end and the Bronze Age was introduced into this country by the Celts, who conquered and drove the Ibernians inland. Many traces of the Celtic occupation can still be seen in the Tumuli or round mounds existing on the heath between Beaulieu and Hythe.

There is every reason to assume that the Celts used their craft for commerce with their French neighbours across the Channel, and it may be accepted that these Celtic invaders in their primitive ships were the first navigators of Southampton Water, and thus became the pioneers of the trade of Southampton. These early traders were followed by the ancient Greeks and Phœnicians in their search for tin. In A.D. 43 the Romans launched a mission to conquer Britain, which was unsuccessful, and it is claimed that in this connection the Emperor Claudius with his legions landed from the river Antona, as Southampton Water was then called.

Tenth to Seventeenth Century.

The actual rise and prosperity of the port, however, commenced with the Norman Conquest, and Continental traders soon recognized the advantages of Hamptun (Southampton) as a centre for the trade which they hoped to establish with England. Thus in the year 1150, at the time when Henry II. married Eleanor of Poitou, the wine trade settled here, and the older part of the town is still honeycombed with wine cellars, many of which date from that period.

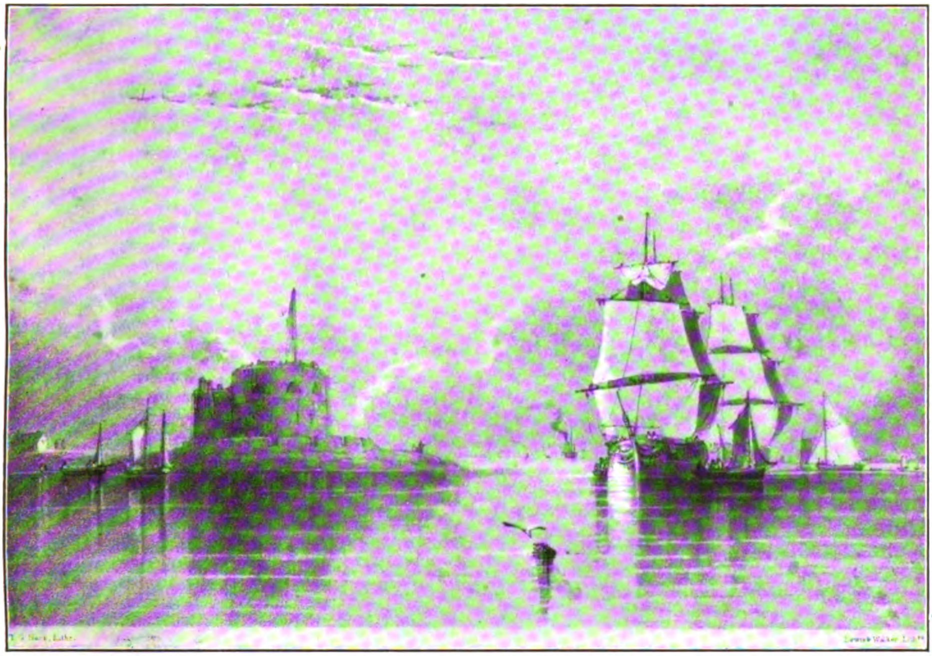
In the year 1250, the wool trade was established at the port, and in this connection it is of interest to note that at that time the office of " Peysage," or wool weigher, was a very important post, generally held by some great nobleman, the Earl of Warwick being one of the first to occupy the position.

The Venetian trade, and commerce with the East, commenced about 1325, at which time trade with Genoa and Spain also began, and thus Southampton became the centre of all trade with the Levant, notwithstanding the tremendous amount of piracy which then prevailed. At this period many merchants from Genoa settled in the town, and in 1379 one, who was very rich and enterprising, undertook, upon certain conditions, to make Southampton superior to all ports in western Europe; but while he was engaged in the negotiations to carry out his project, the London merchants, actuated, it is said, by jealousy, procured his assassination. The remaining Genoese merchants, however, undeterred by the opposition of the Londoners, adhered, at least partially, to their policy, and in 1402 obtained from Henry IV. the valuable concession of landing all their goods at Southampton, thus bringing to an end the policy of his predecessor, Edward III., which was to concentrate all such trade in the port of Calais.

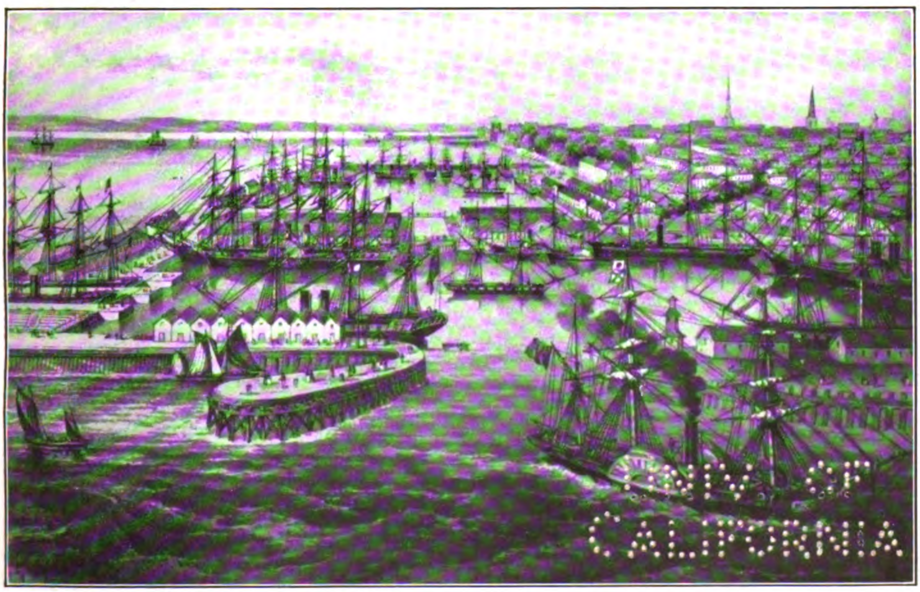
In 1450 Southampton ranked as the third port of importance in the United Kingdom, London being first and Bristol second, and it is estimated that at that time upwards of one-eighth of the whole wine trade of the country passed through the southern port. In addition to wines, large quantities of wax, honey, cotton, flax, sugar, and various fruits were imported from Genoa.

A staple for metal was established at Southampton in 1492, and as no metals were allowed to be exported except from such centres, this introduction was a further aid to the advancement of Southampton. The port had long been engaged in the wool trade under similar conditions, but just at this period, however, the trade showed a decline, due chiefly to a general prohibition of wool exports. Sixty years later, in 1554, Queen Mary was so gratified with her reception at Southampton, when she met Philip of Spain there, that she granted the town a monopoly to import all sweet wines from the Levant.

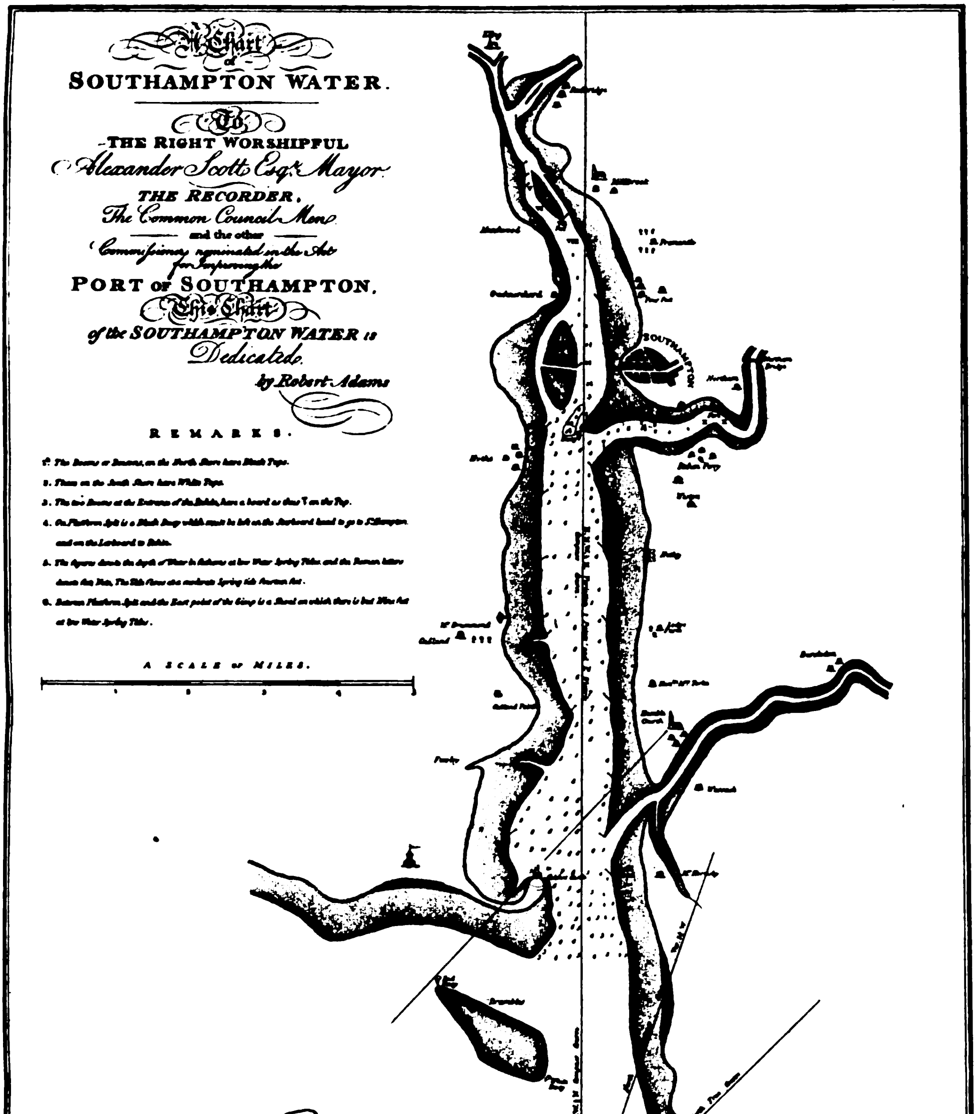
In the seventeenth century, in the reign of James I., Southampton's trade was chiefly with France, Spain, the Channel Islands, and the coast of England; while for a period in the eighteenth century a considerable fish trade was carried on between the port and Newfoundland.



ONE TIME ENTRANCE TO SOUTHAMPTON WATER.



SOUTHAMPTON DOCKS ABOUT 1852.



An Early Chart of Southampton Water.

The foregoing brief outline of the history of the trade in Southampton, shows that even in the early ages the port enjoyed a prosperity and a greatness not unworthy of the foremost position it was destined to attain later upon the construction of the docks.

Beginning of Dock Era.

The provision of docks was contemplated in 1803 by the Act, 43 George III., as the result of an agitation by the burgesses for the abolition of certain dues known as Petty Customs, which were imposed on imports and exports by the Southampton Corporation. The Corporation was willing to forfeit this right upon compensation being given and the projected docks built, the corporation to receive, from the date of the opening of the docks, one-fifth of the harbour dues in lieu of Petty Customs; this agreement is still in operation. Act 43 was altered and amended in 1810 to give powers for the appointment of a commissioner for rates chargeable under the Act, but the construction of docks still remained in abeyance owing to lack of capital, due to the heavy expenditure already incurred in the development of the project; with the result that it was not until the year 1836 that the late Southampton Dock Company was incorporated by Act of Parliament. The proprietors of the newly formed company held their first general meeting, under the chairmanship of Richard Heathfield, Esq., on Tuesday, August 16, 1836, at the George and Vulture Tavern, George Yard, Lombard Street, London.

The chairman announced at the meeting that the directors had acquired 216 acres of ground, immediately adjoining the Town Quay at Southampton, at a cost of £5,000, subject to its being applied to the making of docks and providing other accommodation for the trade of the port within twenty-one years of the passing of the Act. He stated that the site was considered one of the most suitable situations for commercial docks in the United Kingdom. The plan submitted provided for four wet docks, with vaults, warehouses, and sheds, leaving about 19 acres for timber ponds or other purposes. The directors were in agreement that the £5,000 paid for the land was "a fair and full price," and at the same time pointed out the remarkable combination of advantages which the site afforded, bounded as it was on the east by the river Itchen, on the south by Southampton Water, on the west by the river Test, and on the north by the town of Southampton.

Within six miles of the expansive waters sheltered by the Isle of Wight, provided with two passages to the English Channel—St. Helens on the east, at the entrance to Spithead; and the Needles on the west, leading to the Solent—it was felt that the new docks would afford the greatest maritime facilities to the foreign and colonial trade alike, and thus establish a position calculated to attract the commerce of the world. Under these promising conditions it was decided to proceed with the construction of the first dock, then called the North-East Open Dock, and now known as the

Outer Dock. Thus was commenced an epoch which was destined to influence mightily, in the years yet unborn, the commercial history of the British Empire.

First Railway between Docks and London.

The conveyance of the land, however, was not completed until January 12, 1837, considerable time being occupied in the transfer from the Corporation of Southampton, the title involving the tracing of documents as far back as a Charter of Henry II. The first stone of the Outer Dock was laid on Friday, October 12, 1838, the tide being admitted on June 18, 1842, and although incomplete the dock was used for the first time on August 30th of the same year, when two of the Peninsular and Oriental Steam Navigation Co.'s steamers entered it, one of which landed into railway carriages, at the North-Western Quay, passengers, baggage, and cargo from Gibraltar for London. Thus the immediate connection between Southampton Docks and the then L. & S. W. Rly. (now Southern Railway), was established, and a junction effected between the Metropolis and the new undertaking.

This dock had been brought so far towards completion by July 1, 1843, as to enable the directors to announce publicly its opening for general trade. On the same day the Peninsular and Oriental Steam Navigation Co.'s s.s. Pacha, from Gibraltar, entered and discharged her cargo, leaving again in due course with passengers and cargo.

At this period, in addition to the vessels of the Peninsular and Oriental Steam Navigation Co., the Royal Mail Steam Packet Co. also used this dock as a place of arrival and departure for their fourteen mail steamers trading to the West Indies and to South American ports. Other traffic included steamers to and from France and the Channel Islands, and coasting vessels.

It is interesting to recall a statement made by the President of the Institution of Civil Engineers in 1842, taken from an extract dated July 13th of that year, relating to the construction of docks at Southampton : " The large and convenient docks at Southampton will be a useful public improvement, and the estate of the Dock Company appears very favourable for their construction. In combining great security as a harbour, ease of access for ships of large burden in all weather and at all times of the tide, a good roadstead and holding ground, a very gentle run of tide with but little deposit, and an expeditious connection with London by railway, Southampton possesses peculiar advantages."

The First Graving Dock.

The aggregate amount of tonnage entering the dock during 1845 was 158,680, and in 1846, 228,771, being an increase of 70,097 or 44·2 per cent. over the previous year. To meet the requirements of the shipping companies domiciled at Southampton, two graving docks were constructed on the south side of the Outer Dock, the

first being opened on July 11, 1846, and the second in the year following.

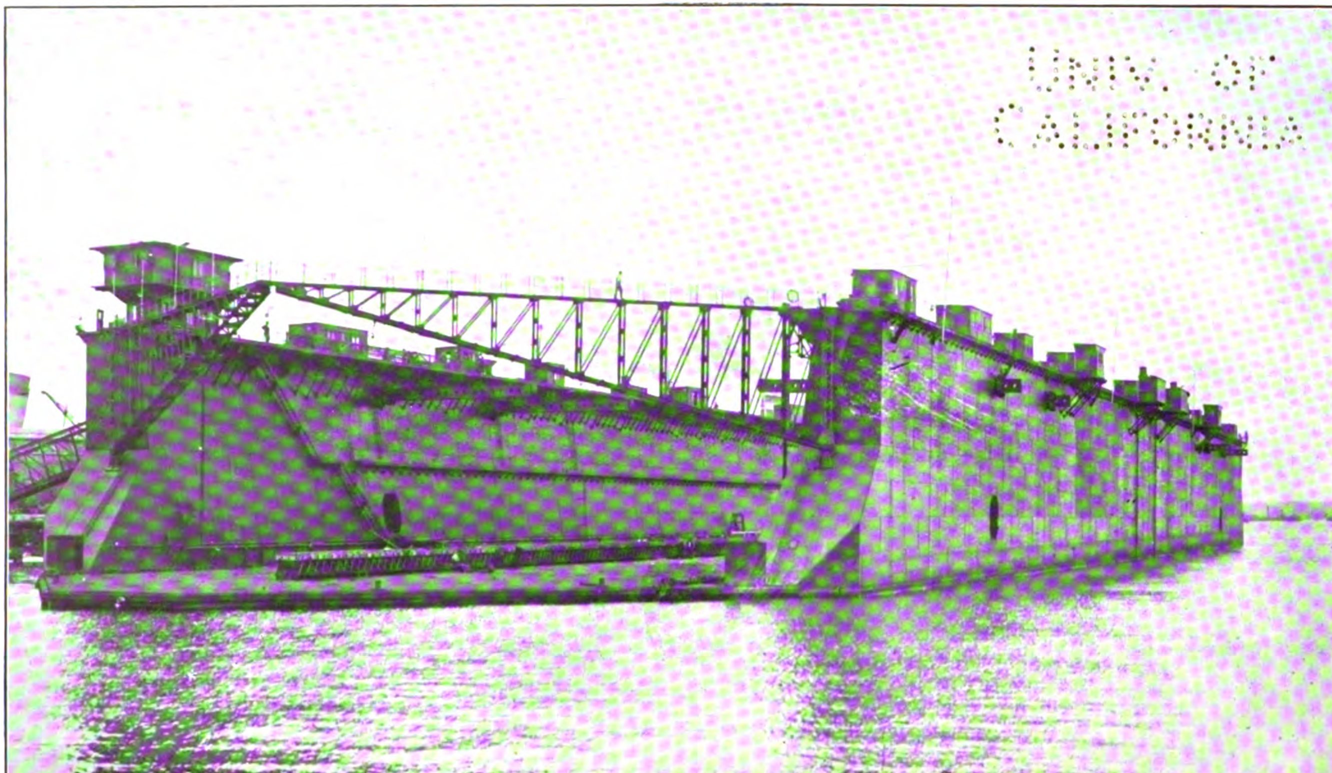
The second wet dock to be built was the Inner Dock, which is the only closed basin on the estate, and was commenced in 1846 and completed in 1851. The increasing number of vessels attracted to Southampton through the opening of the Inner Dock demanded the provision of a further graving dock, the foundation stone of which was laid in October, 1853, and the dock, which was contiguous to the two previously constructed, was completed in 1854. At the time of its completion, although only 80 feet wide and 477 feet long, it was considered a gigantic graving dock, and remained the largest in the port until the construction of the Prince of Wales Graving Dock in 1895.

In the year 1856, the Union Steamship Company, since amalgamated with the Castle Line, and now known as the Union Castle Mail S.S. Co., made Southampton their home port for the arrival and departure of their steamers engaged in the South African trade. These vessels were for a number of years accommodated in the Inner Dock, but with the further development of trade this was found no longer possible, and an extension of accommodation became necessary. To meet this emergency the river quay on the west side of the Itchen was constructed and opened for traffic in 1876, providing a further 1756 feet of quayage. A fourth graving dock, situated on the eastern bank of the Outer Dock, was built and put into use in 1877, principally to meet the Union Steamship Company's requirements.

The tonnage using the docks in 1885 reached the figure of 2,032,736, and it was again decided to extend the accommodation by the construction of the Empress Dock, which provided an additional 3,500 feet of quay. This dock was the last extension undertaken by the late Southampton Dock Company, and was commenced in 1886 and opened for traffic by Her Majesty the late Queen Victoria, on Saturday, July 26, 1890. As evidence of the foremost place which Southampton has held for so many years, it is interesting to record that at the time of the opening of this dock, Southampton was the only port in Great Britain at which vessels of the deepest draught could enter or leave at any state of the tide, and in spite of the rapidly increasing size of modern vessels, that distinction is still held to-day.

The L. & S. W. R. takes Possession: A New Era.

In February, 1891, the Southampton Dock Company, being unable to raise further capital to meet the rapidly expanding requirements of the docks, decided to open negotiations with the L. & S. W. Rly. Co., with a view to the latter taking over the whole of the undertaking. The result of these negotiations was that on November 1, 1892, the whole of the Southampton docks enterprise passed from the hands of the Southampton Dock Company to the L. & S. W. Rly. Co., which proceeded immediately to increase the accommodation and to improve the equipment. This step marked the opening of a new



THE SOUTHERN RAILWAY COMPANY'S 60,000-TON FLOATING DOCK AT SOUTHAMPTON.

era in the history of Southampton Docks, and from that time progress has been extraordinarily rapid.

The first extension undertaken by the new owners was the construction of the Itchen Quays (1,951 feet), which were completed in 1895. Simultaneously with the erection of these quays, the Prince of Wales Graving Dock was built. This dock, 745 feet long and 91 feet wide, was the largest in the world at the time, and was opened for traffic on August 3, 1895, by H.R.H. the Prince of Wales (King Edward VII.).

The South Quay (425 feet) and the Test Quays (4,220 feet) were commenced immediately upon completion of the Itchen Extension, and were completed and opened for traffic in 1902. At the same time one of the largest cold storage installations in the Kingdom was erected for the International Cold Storage and Ice Co., and was completed in 1901. These premises are approached from the open sea, and the sheltered position of the port makes it possible for vessels to be accommodated at any time.

Shortly after the opening of the Prince of Wales Graving Dock in 1895, the rapidly increasing size of the vessels necessitated the construction of another graving dock, 912 feet long and 100 feet wide, which was opened by the Marquis of Winchester on Saturday, October 21, 1905, and named the Trafalgar Dock. This dock at the time of its opening was also the largest in the world.

Owing to the continued increase in the shipping attracted to Southampton, the construction of the Ocean Dock was commenced, and this dock, which was completed in 1911, providing a still further 3,807 feet of quay, is now the home of the largest vessels in the world. The natural channel of the estuary approaching the docks has been deepened by dredging, so that it is now at least 600 feet wide and 35 feet deep at L.W.O.S.T.

Present Status.

The whole of the docks and approaches are lighted by electricity, making them accessible as easily by night as by day.

The gross amount of shipping entering the docks during the year 1924 was 13,868,032 tons, and exceeded the total for 1892, in which year the undertaking was acquired by its present owners, by 485·2 per cent.

A floating dock, specially constructed for the Southern Railway Company, was placed in position at Southampton on April 21, 1924, and opened by H.R.H. the Prince of Wales on June 27th of that year. This dock makes provision not only for the largest vessels at present afloat, but also for larger vessels should they ever be built.

Southampton Docks are amongst the most up-to-date in the United Kingdom in the provision of cranage facilities. In addition to the gradual equipment of the whole of the estate with a modern type of electric crane, an important acquisition was made recently by the installation of a 150-ton electric floating crane, one of the largest in existence. The whole of the quays are equipped with modern passenger and cargo sheds, replete with the latest appliances,

including specially constructed shedding for the storage of wooden goods. In addition, warehouse and vault accommodation for free and bonded goods, either from ship or rail, is provided.

There are 42 miles of railway on the estate, extending to all quays, sheds, and warehouses, linking them up with the main line of the Southern Railway, and thus giving direct communication with every railway in the Kingdom, London being only 1 hour 32 minutes' rail journey from Southampton.

There is a coal jetty with electric power cranes, and spacious coal barge docks have been constructed on the Itchen for the purpose of stowing coal in lighters for bunkering outgoing liners. These coal docks are capable of floating 20,000 tons of coal at one time.

The great increase in the number of modern steamers consuming oil fuel has demanded special facilities for replenishing bunkers, and adequate arrangements have been made to meet these requirements, most of the principal oil fuel companies having opened branches and storage depôts at the port.

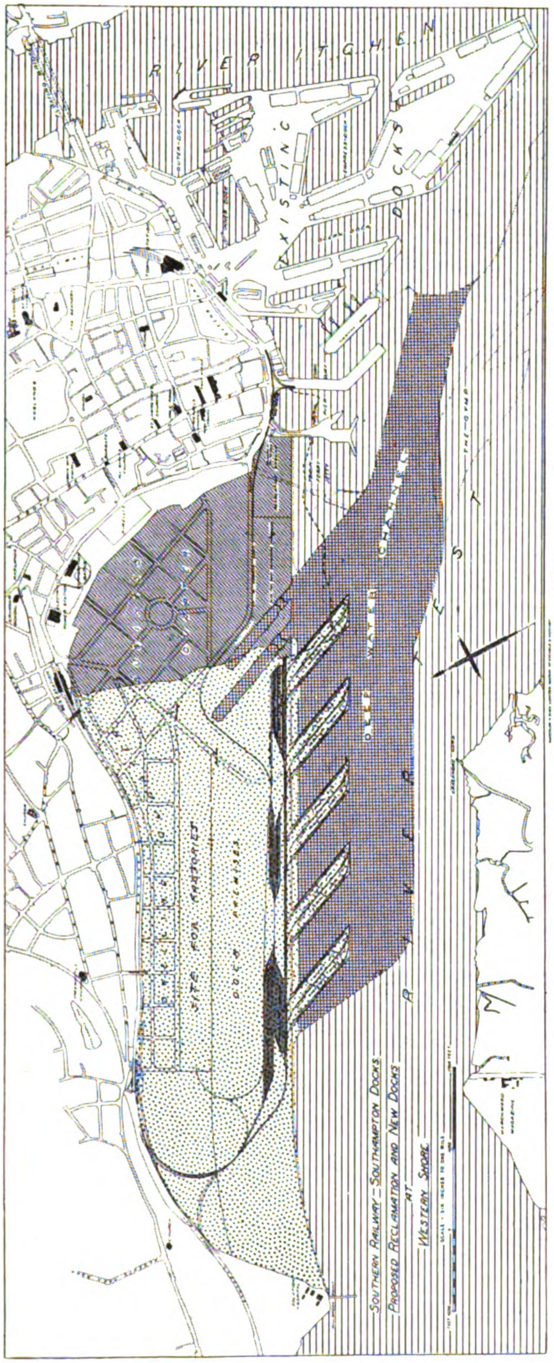
The development of the port since the acquisition of the dock undertaking by its present owners has involved the provision of adequate facilities for ship repairing and engineering to meet the requirements of the great shipping companies using Southampton Docks, and in this respect the port now provides some of the finest accommodation, several of the leading shipbuilding and engineering firms in the kingdom having established depôts on the estate capable of meeting fully any necessities which may arise.

Southampton during the Great War was Britain's No. 1 port of embarkation, and during that period the record of traffic dealt with at Southampton Docks was as follows :—

Personnel	7,689,510
Horses and mules	856,492
Guns and limbers	14,770
Vehicles, all kinds	177,953
M.F.O. parcels and mailbags	7,436,916
Stores, ammunition (tons)	3,381,274
Ships handled	16,291

New Schemes.

Further expansion again being necessary in order to accommodate the ever-increasing trade, the Southern Railway Company have obtained Parliamentary powers for the extension of the dock and wharf accommodation at Southampton. The full scheme involves the reclamation of approximately 460 acres of mudlands in the bay which exists in the estuary of the river Test, between the existing docks and Millbrook Point. It provides for the construction of five reinforced jetties, each 1,000 feet long and 260 feet wide, with a depth of water alongside of 35 feet or more at L.W.O.S.T. The jetties will be equipped with double-storied sheds and furnished with the most modern appliances to facilitate rapid loading of both cargo and baggage. Each jetty will accommodate two large vessels such as the Majestic, Berengaria, and Leviathan. A deep-water channel, 600 feet wide, will be dredged and maintained to enable the



PLAN OF SOUTHAMPTON DOCKS, SHOWING PROPOSED EXTENSIONS.

largest vessels to approach the jetties direct from the sea, and berth alongside at any state of the tide. Ample space will be devoted to the necessary dock premises, including marshalling and standing sidings, warehouses and offices. Space will also be reserved for two graving docks, one of which will be capable of accommodating the largest vessels ever likely to be built.

It will thus be seen that the plans which are being laid for the Southampton Docks of the future are calculated to ensure the permanence of the premier position which past history records and present facilities indicate, and it is safe to prophesy that, great as has been the progress in the past, and great as is the advancement ot the present, these will be surpassed by the developments of the future.

EVERARD BARING.

CHAPTER VII.

Present Position of the British Iron and Steel Industry.

Since shipbuilding, embracing shiprepairing and marine engineering, is the greatest consumer of iron and steel in this country, it is appropriate that this volume should contain an article dealing with an industry so largely connected.

According to the chronology of iron and steel by Professor S. L. Goodale, of Pittsburg, the first iron vessel of importance made its appearance on the canal at Birmingham in 1787, and was 70 feet in length, 6 feet $8\frac{1}{2}$ inches in beam, and was built of $1\frac{5}{16}$-inch iron plates. In the same year, John Wilkinson used an iron barge to transport castings down the Severn from his Coalbrookdale works. The first iron vessel in Scotland was a barge named Vulcan, built on the Monkland Canal in 1818, which remained in service until 1875. The first iron ship to go to sea was the Aaron Manby, which was built by the Horseley Company near Birmingham, and put together in London; her maiden voyage was between London and Paris in 1820. The first ocean-going steamer was built by Laird and Company of Greenock in 1858. The construction of iron warships was commenced in 1860–1861, when H.M.SS. Black Prince and Warrior were laid down, and the British Admiralty introduced steel as an exclusive main material in the Iris and Mercury in 1876.

Since shipbuilding in this country consumes more iron and steel than any other single industry, it is interesting to note the finding of the Government Committee which reported in 1917 as to the future position of the shipping and shipbuilding industries. After considering carefully the quantity of iron and steel consumed by British shipbuilders and marine engineers, they came to the conclusion that in 1913 the total quantity of steel materials incorporated in war and merchant ships and marine engines constructed in that year was not less than 1,400,000 tons, and they estimated that the weight of ingots to produce this steel would not be less than 1,850,000 tons. Allowing for imports and exports, the committee stated that shipbuilding and marine engineering industries accounted for fully 29 per cent. of the total consumption.

Falling off in Production.

The depression in shipbuilding, therefore, obviously accounts for a considerable proportion of the depression in the iron and steel industries, especially in Scotland and the North-East Coast, where

the bulk of the shipbuilding material is produced. The following table shows the total production of steel ingots and steel plates in the United Kingdom, and also that for the North-East Coast, and Scotland for the years 1920 to 1924.

TABLE I.—PRODUCTION OF STEEL INGOTS AND PLATES.

	Total Output.		North-East Coast.		Scotland.	
	Ingots.	Plates.	Ingots.	Plates.	Ingots.	Plates.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1920	8,860,200	1,654,700	1,918,800	588,000	2,029,300	753,100
1921	3,600,100	599,700	988,600	267,000	566,400	215,900
1922	5,794,500	577,200	909,900	210,000	755,500	198,600
1923	8,330,000	1,018,000	1,658,400	429,800	1,227,200	360,300
1924	8,047,500	1,130,000	1,687,400	486,600	1,216,000	432,600

There are, however, many other causes operating to account for the prolonged depression, and before considering some of these causes it may be as well to give a few facts and figures indicating the measure of the depression. The foundation of all iron and steel is pig iron, which is made by smelting iron ore in a blast furnace. There are some 480 blast furnaces in this country, and having regard to their equipment, the necessity of duplicate auxiliary plant to ensure continuity of operation, etc., it would be possible for about 360 of these to be blowing at one time. Throughout 1913, in fact, there were on the average 338 furnaces blowing, and the maximum number of furnaces blowing at any one time since the war was 303, in September, 1920. Since that date the number has gradually declined, until it stood at only 109 on the eve of the coal stoppage of 1921; during that stoppage almost all the furnaces went out of operation. After the stoppage, the furnaces were gradually re-lighted, and the maximum number blowing since that date reached 223 at the end of May, 1923. Since then there has been a continuous fall in the number of furnaces in operation until on August 31st last the number blowing was only 136.

MAXIMUM OUTPUT.

When we turn to the various problems of production, some interesting conclusions emerge.

(*a*) *Pig Iron.*—The year of maximum production of pig iron was 1913, when 10,260,300 tons were produced. In spite of all efforts to increase production during the war, this figure was not attained, the deficiency in pig iron during the war years being made good by restricting the exports, by a lessened use of pig iron for purposes other than for steel making, by the use of scrap resulting from the increased quantities available at that time from the munitions factories, and by imports of pig iron, etc., from America. The so-called boom year of 1920 was one of price rather than

of production, the output of pig iron in that year amounting to 8,034,700 tons, or an average monthly production of 669,500 tons, compared with 855,000 tons monthly in 1913. On account of the coal stoppage, the production in 1921 amounted only to 2,616,300 tons, or an average monthly output of only 218,000 tons, a figure lower than that in any year since 1850. The average monthly production in 1923 was 620,000 tons, and in 1924 609,900 tons. The 1925 output has declined still further, and in July last it was at an average yearly rate of no more than 6,000,000 tons.

(*b*) *Steel.*—The position with regard to steel production is relatively worse than that of pig iron, for the steel productive capacity was expanded by at least 50 per cent. during the war, so that, although steel production shows, in fact, a slight increase over pre-war production, its relation to capacity is less. Steel production in 1913 amounted to 7,663,900 tons, but by dint of great effort and expanding our capacity at great capital cost, steel production was increased to a maximum of 9,716,500 tons in 1917. In 1920 the output amounted to 9,067,300 tons. In 1923, partly owing to the Ruhr occupation, production amounted to 8,481,800 tons, but in 1924 fell to 8,221,000 tons, and for the first half of 1925 has been at a rate of 7,553,000 tons per annum.

(*c*) *Wrought Iron.*—Production of wrought iron is also of special interest to the shipbuilding industry, since it is of wrought iron that anchors, cables, chains, etc., are made, owing to its ability to resist corrosion and to withstand shock. In 1913 the production of puddled bar amounted to 1,206,700 tons, in 1920 the output of puddled and scrap bar had fallen to rather less than one million tons, and in 1924 to 596,000 tons.

TABLE II.—PRODUCTION OF WROUGHT IRON FROM 1920 TO 1924.

	1920.	1921.	1922.	1923.	1924.
	Tons.	Tons.	Tons.	Tons.	Tons.
Puddled bar	588,700	218,300	219,800	332,400	305,700
Scrap and bushelling bars. . .	386,800	182,600	229,100	313,900	290,200
	975,500	400,900	448,900	646,300	595,900
Bars, rods, rds. sqrs., flats, shapes and sections, etc.	594,700	249,300	293,300	413,800	369,300
Rolled tube, hoops and strips. .	107,300	31,300	38,600	48,900	48,500
Hoops and strip (other than tube)	13,100	6,800	7,500	6,000	4,800
Sheared strip, plates, and other finished material.	44,800	15,500	12,500	18,500	21,800
	759,900	302,900	351,900	487,200	444,400

MOVEMENT OF EXPORTS AND IMPORTS.

Exports.—After cotton, which of course is Great Britain's greatest export and normally accounts for about one-third of the total, iron and steel vie with wool for the second place.

Before the war, exports of iron and steel averaged 10 per cent. in value of the total exports of the country, so that the industry plays a considerable part in contributing towards the payment of Great Britain's purchases of foodstuffs and raw materials. Exports of iron and steel in 1913 amounted to 4,969,000 tons. In 1920 the industry was not able to take advantage to its full extent of the very large foreign demand owing to the unsatisfied home requirements. Exports, therefore, amounted only to 3,251,000 tons in that year, and in 1924 to only 3,853,000 tons. Exports in the first half of 1925 were at an annual rate of 3,660,000 tons.

Imports.—While exports have been declining, imports on the other hand have been increasing. In 1913 the imports amounted to 2,231,000 tons, and in 1924 to 2,429,200 tons, in spite of the fact that the steel productive capacity of the country had been increased by about 50 per cent. In the first six months of 1925, the imports were at an annual rate of 2,800,000 tons; thus, as production decreases, imports are increasing.

Financial Aspects of the Industry.

Serious as the position is as reflected by the figures of production, imports and exports quoted, they do not define the full measure of the depression which has been caused by the acute competition to secure such business as has been available. This is more clearly shown in the prices, financial results, and unemployment.

(*a*) *Prices.*—The wholesale price index number of the Board of Trade is well known, and according to this index number, wholesale prices in July stood at 57·5 per cent. above the 1913 level. Iron and steel prices, however, which are a component part of this index, stood at only 24·5 per cent. above their 1913 average. Prices in 1913, 1920, and July, 1925, of plates and sections, which are of special interest in connection with shipbuilding, are given below:

	Plates.			Sections.		
	£	*s.*	*d.*	£	*s.*	*d.*
Average, 1913 . . .	7	17	9	7	9	0
Average, 1920 . . .	23	15	0	23	9	0
July, 1925	8	15	0	8	6	3

(*b*) *Financial Results.*—While there has undoubtedly been a great increase in efficiency since 1913, this increased efficiency is not sufficient to make profitable the prices quoted above. The National Federation of Iron and Steel Manufacturers has examined the balance sheets of twenty-seven companies engaged in the manufacture of iron and steel. These companies had a total paid-up ordinary share capital of £72,000,000, and were responsible in 1924 for at least one-half of the pig iron and steel production of the country. Fifteen of these companies, with an ordinary share capital of £43,000,000, paid no dividends for their last financial year, and of these, eleven, with an ordinary share capital of £25,000,000, had passed their ordinary dividends for two years, seven with an ordinary share capital of

£15,600,000 for three years, and one for four years. Another measure of the financial depression may be seen in the ratio of the market value to the nominal value of the share capital of companies engaged in the manufacture of iron and steel. The Statistical Bulletin of the National Federation of Iron and Steel Manufacturers publishes regularly this ratio with regard to thirty-four companies whose paid-up ordinary capital is nearly £90,000,000. The ratio of the market to the nominal value on June 30 was 64·9, whereas on March 31, 1920, the percentage of these same companies stood at 166·4.

(*c*) *Unemployment*.—The percentage of unemployed in all the insured trades in Great Britain, according to the Ministry of Labour, stood in July, 1925, at 11·5 per cent., whereas the amount of unemployment in pig iron manufacture was 21·4 per cent., and in steel smelting and iron puddling furnaces and steel rolling mills and forges, 25 per cent.

Evidence of Efficiency.

What, then, are the reasons for a depression so unparalleled, even in an industry which is normally used to fluctuations? Perhaps it would be as well, in the first place, to dissipate any idea there may be, that any great part of the reason may be due to inefficiency. That this is not the case is clear from a consideration of two or three factors. In the first place, the industry is immeasurably better equipped than in 1913, the year which saw the maximum production of pig iron, and the pre-war maximum production of steel. The amount of expansion and reconstruction involved by the war was such as to render many of the works in this country second to none in the world, and even our most recent German critic, Dr. Niebuhr, in " Die Reorganization der englischen Industrie," admits, although criticizing our efficiency in some respects, that " what has been achieved may be regarded as a remarkable success."

The result of the war was to expand the pig iron capacity of the country from about 11,000,000 tons to 12,000,000 tons per annum, while the steel capacity was expanded from 8,000,000 to rather more than 12,000,000 tons. Another fact which is *primâ facie* evidence of the comparative efficiency of the industry is the price index quoted previously. The critic who blames the inefficiency of the industry for most of its troubles may quite properly be asked in what other staple industries have prices been reduced to the extent that they have been in the iron and steel industry? If space permitted, we could trace the effect of previous wars on the iron and steel industry. For this we must refer readers to a chapter in Mr. T. S. Ashton's excellent book, " Iron and Steel in the Industrial Revolution," but the fact may be briefly stated that all wars since gunfounding was invented have first stimulated and then depressed the iron and steel industry. E. C. Eckel, in " Iron, Coal and War," points out that the rate of growth in the iron and steel industry was less in the decade following the Napoleonic Wars than in any other, and gives the following figures :—

Decade ending	World iron output, per cent. increase.
1810	38
1820	33
1830	83
1840	71
1850	57
1860	72
1870	77
1880	52
1890	49
1900	46
1910	62

INFLUENCE OF WARS.

In the work by Ashton referred to, it is pointed out that during the commercial crisis which invariably followed the declaration of hostilities, the iron and steel industry suffered with others, but that its recovery was always swift, and that in each war period a trade boom was generated. The iron and steel industry did not escape the inevitable depression due to war, but its incidence was deferred. The outbreak of war meant not a diminishing but an increased demand for iron and steel in the shape of munitions of all kinds, and the industry grew in proportion as the demand for munitions of war increased. Considerable technical progress and discovery have also resulted as the outcome of the war. For instance, gun-casting proved a great stimulant of improved technique in the foundry.

TABLE III.—IMPORTS AND EXPORTS OF IRON AND STEEL OF THE CHIEF PRODUCING COUNTRIES, 1913 AND 1924.

(In thousands of long tons.)

Country.	Imports.		Exports.	
	1913.	1924.	1913.	1924.
United Kingdom	2,231	2,430	4,969	3,853
France	170	695	620	2,658
Belgium*	874	591	1,551	3,248
Germany*	300	1,240	6,202	1,510
United States	253	480	2,908	1,790
Total	3,828	5,436	16,250	13,059

Mr. Ashton puts the matter very well with regard to the Napoleonic Wars when he says, "A stimulant is not necessarily invigorating in the long run, and it is arguable that if the industry had not been subjected to the feverish touch of war during the period of growth, its constitution in later years would have been more robust and its final stature would have been no less great." The result of the Great War has been similar to that of the wars

* In 1913 the imports and exports of Luxemburg are included with Germany; in 1924 they are included with Belgium.

in the past in giving us an increased capacity for production combined with a reduced demand. The reduced demand on the part of the shipbuilder has already been mentioned. With regard to the reduced demand from abroad, a table is reproduced below showing that exports of iron and steel from the chief producing countries in 1913 amounted to 16·3 million tons, but in 1924 they totalled only 13 million tons. Imports into the same countries in 1913 amounted to 3·8 million tons and in 1924 to 5·4 million tons, leaving a balance of exports to non-producing countries of 12·5 million tons in 1913 compared with only 7·6 million tons in 1924.

Increased Production Abroad.

But while the demand has diminished, the capacity to satisfy it has increased; not only has Great Britain's capacity for production expanded, as we have already seen, but increases have also taken place in all the other producing countries, while there is a tendency on the part of the newer countries to produce iron and steel for themselves. With regard to increased capacity, it may be said that Germany, in order to make good the losses due to the return of Lorraine to France, has expanded the works in the territory remaining to her. France has not only rebuilt the plant destroyed during the war, but has in addition the plant she was compelled to erect away from the frontiers, when her chief works were in the firing zone; while Belgium's reconstructed works have a capacity at least 20 per cent. in excess of those which were destroyed. The greatest increase in capacity has taken place in America. Production of pig iron in the U.S.A. in 1923 amounted to 40,400,000 tons, compared with 31,000,000 tons in 1913, and of steel to 45,000,000 tons compared with 31,300,000 tons in 1913. Production, however, declined in 1924 and amounted to 31,400,000 and 38,000,000 tons respectively. Fortunately, however, America's home demand has increased with equal pace, and therefore American competition has not been seriously felt. The competition that takes place when capacity so far exceeds demand, can well be imagined, and there are various causes which give the advantage to our European competitors. The first and most prominent of these is the constantly depreciating exchange.

Costs and Prices.

It is obvious, for instance, that when French pig iron is, say, 300 francs per ton and exchange is, say, 100 francs to the £1, French pig iron can be bought in Great Britain for 60*s*., plus transport charges; if the franc suddenly falls to, say, 120 to the £1 the French producer can still sell for 300 francs per ton, since the rise in costs is very much slower than the fall in the exchange, but the British importer pays only 50*s*. per ton.

It is to this exchange factor that a great deal of the discrepancy between British and Continental prices is due. It is therefore not

surprising that when the rates of exchange between Great Britain, and France, and Belgium are compared with the imports of iron and steel into Great Britain from those countries, imports are seen definitely to increase whenever the franc is depreciating. Another factor giving advantage to the Continent is the longer hours of work and the lower wages paid; while the lower wages do not represent a standard of living so low as is represented by their conversion into sterling at the current rate of exchange, nevertheless their conversion into sterling is the measure of their competitive advantage. The Continent, too, enjoys much lower taxation than does this country. The latest estimates on this subject were those published by the New York Trust Company in the July number of the *Index*, and quoted in the *Economist* of August 8, 1925. The taxation per capita and the proportion this bears to the national economy according to this estimate is as follows :—

TABLE IV.—INCIDENCE OF TAXATION.

	Taxation (national and local) per capita.	National income per capita.	Proportion of national income absorbed by taxation.
	$	$	Per cent.
Great Britain . . .	86·94	374·74	23·2
France	39·07	186·98	20·9
Italy	19·04	99·17	19·2
Belgium	24·83	146·06	17·0
United States . . .	69·72	606·26	11·5

Transport forms a very big item in the cost of iron and steel production in all countries, since the materials to be assembled are of such bulk; some eight tons of materials have to be carried by the railway companies for every ton of finished steel produced. Distances in most competing countries are greater than in Great Britain, but any advantage accruing to Great Britain from this fact is offset by the very much lower freight rates operating on the Continent.

CUT-THROAT COMPETITION.

While the industry in Great Britain is suffering from acute depression, it must not be inferred that the industry in other countries is prospering. With the exception of the United States, the trade Press of all countries lament that the industry is not profitable, and figures are often quoted showing that orders have frequently to be taken below the cost of production, which is further evidence that the competition is of a cut-throat nature. This means that it cannot continue at its present intensity indefinitely, but, while it lasts, the resources of the combatants are being very severely strained. When a greater measure of political and financial stability is reached the world demand not only for iron and steel, but for all other commodities will increase. This will demand increased shipping facilities, for a great deal of the present tonnage which is laid up can never be economically worked. With the increased demand both from home and abroad, Great Britain will probably be in as good a position as her competitors to meet it, for the geographical

considerations which made Great Britain the biggest exporter of iron and steel still obtain, and in spite of all the difficulties and drawbacks which Great Britain has experienced in the last few years, she is still in fact the biggest exporter of iron and steel.. The relative position of Great Britain is best shown by the following tables, giving the production of pig iron and steel in the chief producing countries, and the exports of iron and steel from the chief exporting countries.

TABLE V.—PRODUCTION OF PIG IRON AND STEEL OF THE CHIEF PRODUCING COUNTRIES IN 1913, 1924, AND FIRST HALF 1925.

(In thousands of tons.)

	Pig iron.			Steel ingots and castings.		
	1913.	1924.	1st Half 1925.	1913.	1924.	1st Half 1925.
United Kingdom . .	10,260	7,319	3,379	7,664	8,221	3,777
France	5,126	7,535	4,027	4,614	6,799	3,512
Belgium	2,446	2,764	1,508	2,428	2,816	1,432
Luxemburg . . .	2,508	2,141	1,122	1,305	1,857	996
Germany	16,499	7,200 *	4,500 *	17,334	9,150 *	6,000 *
United States . . .	30,966	31,406	19,010	31,301	37,932	22,406

* Estimated.

TABLE VI.—EXPORTS OF IRON AND STEEL FROM THE CHIEF PRODUCING COUNTRIES, 1913, 1922 TO 1924, AND FIRST HALF 1925.

(In thousands of tons.)

	1913.	1922.	1923.	1924.	1st Half 1925.
United Kingdom	4,969	3,397	4,320	3,853	1,832
France	620	1,937	2,183	2,658	1,700
Belgium *	1,551	1,716	2,500	3,248	1,550
Germany *	6,202	2,516	1,307	1,510	1,467
United States	2,908	1,931	1,944	1,790	805
Totals	16,250	11,497	12,254	13,059	7,354

* In 1913 the exports of Luxemburg are included with Germany; from 1922 onwards they are included with Belgium.

C. E. LLOYD.

CHAPTER VIII.

Developments in Marine Machinery.

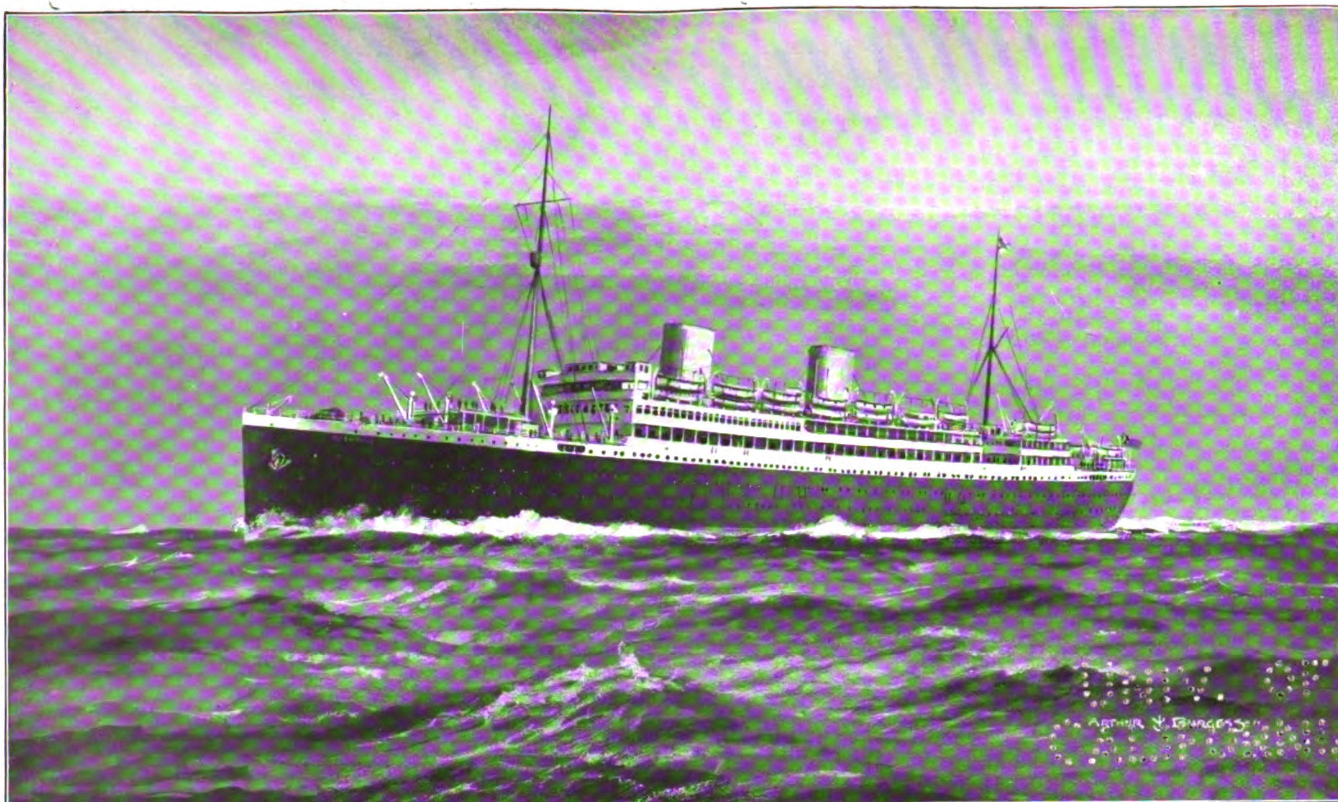
The most important consideration concerning marine propelling machinery since the last issue of the "Annual" is the absorbing question of the economic supremacy of the motor ship. For the first time in the history of the mercantile marine, the gross tonnage of motor ships building to-day definitely exceeds that of steamers actually under construction. The figures of gross tonnage from Lloyd's Returns, June, 1925, are: steamers, 1,212,525 tons (1,085,843 excluding those upon which work is known definitely to have been suspended); motor ships, 1,129,912 gross tons. This shows a decrease in steamer gross tonnage as compared with the construction going forward in June, 1924, of 22 per cent., and an increase in motor tonnage of practically 40 per cent. These figures are eloquent of the very rapid growth of popularity of the motor ship. The United Kingdom does not take the same place in motor construction as elsewhere. The percentage of motor tonnage to steam tonnage here is only 58 as compared with 130 in other countries. In respect of indicated horse-power, Diesel engines at home represent 41 per cent. of steam reciprocating and turbine engines combined, as compared with 145 per cent. abroad.

The average indicated horse-power per 5,000 tons gross of shipping abroad is 4,100 indicated horse-power, as compared with 2,700 indicated horse-power at home. Therefore, both in respect of percentage motor to steam tonnage, and also in the amount of power per ton, the foreign shipowner is more favourable to the Diesel oil engine.

In considering the growth of motor tonnage, in spite of a very substantial falling off in shipbuilding generally, the percentage of motor to steam tonnage has increased from 18 in June, 1923, to 45 in June, 1924, up to 93 per cent. to-day for the world, including in steamer tonnage those ships upon which work is suspended, and neglecting the many cases of conversion from steam to motor propulsion now going forward, of which the programme of the United States Shipping Board is a notable example.

Steamers *v.* Motor Ships.

The whole of the marine world has been stirred by the controversy which had as its starting-point the views, strongly favouring the motor ship, expressed by Lord Bearsted and Sir Fortescue Flannery



(*From a drawing by Arthur J. W. Burgess.*)

TWIN-SCREW MOTOR PASSENGER LINER GRIPSHOLM FOR THE SWEDISH-AMERICAN LINE, GOTHENBURG.

(*Constructed by Sir W. G. Armstrong, Whitworth & Co., Ltd., Newcastle.*)

before the Royal Society of Arts on February 11 of the current year. A lengthy correspondence in *The Times* followed. Sir John Biles delivered an able paper before the Institution of Naval Architects on April 1, entitled "The Relative Commercial Efficiency of Internal Combustion and Steam Engines for High-Speed Passenger Liners." Whilst this paper had a specific title and the subject-matter was more or less confined to the question of the propulsion of high-speed passenger liners, yet the discussion which preceded and has followed it has been very general, and therefore in dealing with this matter now, the general as well as the particular aspect will be dealt with broadly.

It is not in any way a subject for wonder that the enormous interests in this country centred in the steam turbine should have presented one important alternative to the steady course now being pursued by the world's shipowners in strongly favouring the Diesel oil engine by great and repeated orders for motor vessels. We are justly proud of our unequalled position in steam engineering, attained largely as a result of the long lead given by the pioneer work of its genius, Sir Charles Parsons. In presenting such a case, a great service has undoubtedly been done, and a careful study of all the points involved can only serve to give a much clearer view of all the factors and lead, therefore, inevitably to a very solid basis for future development, coupled with the increased satisfaction of firmly held confidence in the correctness of the decisions come to.

Any detailed review of the very considerable mass of information given, and opinions expressed, must commence on a note of deep regret that shipowners, with their definite experience of the motor ship, should have remained so completely silent on a subject so peculiarly their own. What is the reason? They are certainly capable of presenting their complete case. In times such as we are now experiencing, when severe competition must be met in all directions, the economic facts bearing on shipowning are as carefully scrutinized by those responsible as are those of any other industry. When discussing this subject with some of our leading shipowners, who have ordered repeat motor ships as a result of the satisfactory performance of earlier similar vessels in direct competition with steamers on the same trade routes, the only reply elicited was that such experience was their stock-in-trade, and would not therefore be passed on for the advantage of others, particularly competitors. In one case it was stated that on the same trade route the motor ship showed a substantial saving per ton mile in operating costs. On this particular run, of between two to three months' duration, the motor ship had the advantage of one week less time for the same amount of work. It was also stated that a better class of man was attracted to the motor ship.

The question of the greater average speed maintained by the motor ship should be enforced, as it is seldom understood. It is due to the fact that in normal weather, when the propeller is not always completely immersed, the governing of the revolutions of the Diesel oil engine is extremely close, the speed does not fall, and the average is well maintained. In rough weather, the advantages of governing

are still considerable, and the power developed by the engine is quite independent of the personal element.

The foregoing is only given as one example. Others could be cited, and if they are not representative, then shipowners are following a fashion regardless of their best commercial interests. If, on the other hand, these statements are a true index, then there must be some fundamental mistake in the figures given before the Institution of Naval Architects, which have not yet been definitely pointed out, at any rate so far as they are applicable to the general type of vessel.

As already stated, shipowners did not take any part in this discussion, and it is equally deeply to be regretted that engine builders, who have specialized in the construction of internal combustion machinery, were not asked, or at any rate did not participate. To this extent the value of the proceedings is very greatly reduced. Where, then, are the errors in the case as there presented ?

Cost of Operation.

Firstly, the general figures for the cost of running Diesel engines given by Sir John Biles were, so far as can be judged, based on the earliest records of a pioneer vessel—the first of her class—taken before the machinery or the personnel had settled down to give a steady performance. In particular, for instance, the lubricating oil consumption was at least double what the leading constructors of four-stroke cycle Diesel engines are prepared, as a result of much sea experience, rigidly to guarantee to-day. Secondly, the ratio of price of Diesel and boiler oil fuels and coal do not refer to the general run of vessels. The following figures have been obtained from a leading shipowner :—

	Prices per ton for oil fuel. Diesel fuel oil.		Boiler fuel oil.	
	s.	*d.*	*s.*	*d.*
New York	68	6	50	6
Panama	71	6	49	3
Honolulu	67	0	51	6
Singapore	80	0	74	0
Aden	62	6	62	6
Oran	67	6	67	6
Average	69	8	59	2

Average price of coal, 35s.

It will be seen from the above that the average price of boiler oil is 83 per cent. of the price of Diesel oil, and that in the port where Diesel oil is quoted at the lowest rate, the price of boiler oil is the same as the price of Diesel oil. Due to the higher consumption, the steamer has very considerably less bunker capacity and so cannot take the same advantage of filling up at the cheapest port on the trading route. This confers a further advantage to the motor ship.

In considering the question relative to coal-fired steamers, from the foregoing table it will be seen that the ratio of the average prices

of coal to Diesel fuel oil is 2 to 1. The savings due to Diesel engines, therefore, in this case, assuming this ratio, which is unfair owing to the much greater bunker capacity of the motor ship, are quite obvious, since the motor ship, with Diesel electric auxiliaries, will only consume from one-fourth to one-fifth the quantity of fuel of a coal-fired cargo steamer.

There is one case in point, which has peculiarly come to the writer's direct attention—motor ships in competition with steamers, both bunkering in Great Britain, *i.e.*, the one in a dear oil market and the other in one of the cheapest coal markets. It should also be pointed out that the steamers in question have the higher trial trip and fair weather speed. Any tabulated statement similar to those so often prepared, taking into account all possible calculable factors, would show these steamers clearly to have the advantage. What are the facts? On the assurance of the owner of this considerable fleet, there is, after several years' experience, a very appreciable saving with the motor ships, due to the following factors: rapid and most economical handling of cargo with electrical winches: extra speed, especially in normal and bad weather, permitting the motor ships to exceed the best and so-called faster steamer's mileage per annum by no less than 15 to 20 per cent.; very clean turn out of the cargo due to the absence of heat radiation, etc.

Were the case such that these motor ships could bunker in a cheap oil market, and the steamer compelled to buy some coal in dear ports, the further savings that would accrue would obviously be nothing short of enormous.

Boiler Oil.

If the price of boiler oil were very substantially lower than that of Diesel oil, the cost of the installation of extra heating, separating and filtering apparatus, together with the higher annual charge for renewing liners and piston rings would be supportable, and there would be a greater incentive towards the use of boiler oil in Diesel cylinders.

The first cost of the motor engine is still much greater than that of steam machinery. The difference is being reduced due to standardization, concentration on the methods of shop production suitable to mass fabrication, improvements in design, reducing workmanship, the introduction of the double-acting principle, and, with four-stroke cycle machinery, the adoption of supercharging.

Auxiliaries.

The more general acceptance of electric auxiliaries must always keep the motor ship price high, although it is seldom now disputed, except in special cases such as tankers, that the extra cost for electric auxiliaries as compared with steam is very rapidly written off by the very great economies so effected.

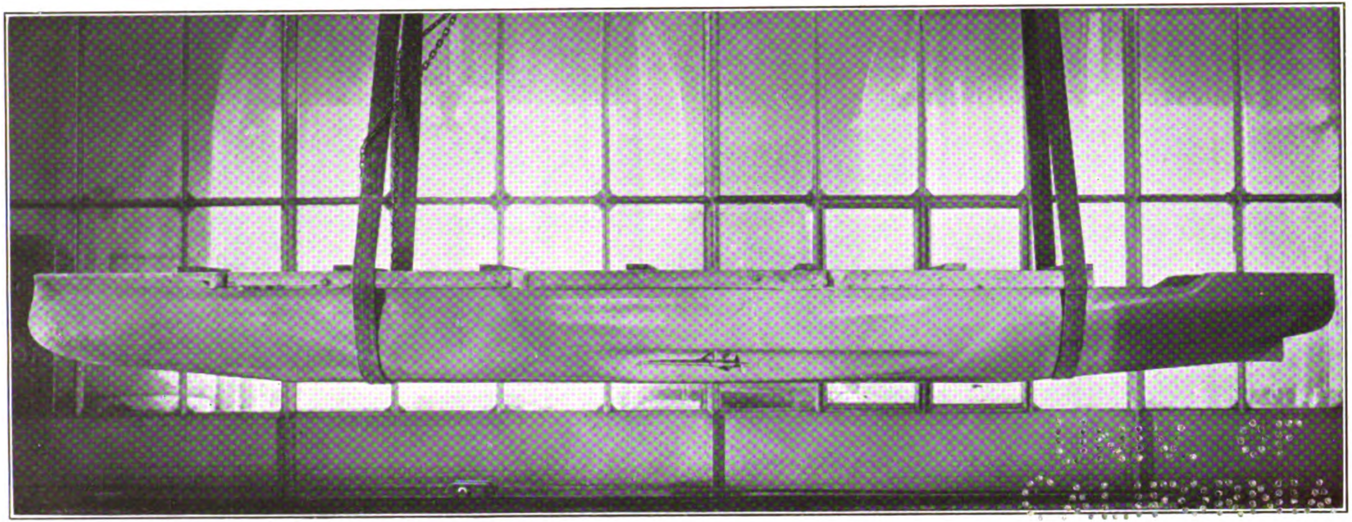
Sufficient experience is now available of ocean-going motor ships, extending to fourteen years of continuous operation, to show definitely that the life of motor engines is quite satisfactory. The wearing parts are relatively small and quickly renewed, and there are no parts subject to the same obscure and sometimes rapid deterioration as is met with in boilers and condenser tubes.

Whilst giving full credence to the possibility of improving the performance of steam machinery, no cognizance is taken in the paper before the Institution of Naval Architects of the steady improvements being made with the Diesel engine which, after all, is still in its infancy. A very considerable proportion of the heat of combustion of the fuel is rejected to the exhaust and the cooling water, which the Still engine has proved can be converted into useful work. The larger the unit cylinder, the greater the possibilities in this direction. The development of the double-acting engine has only commenced, but important economies will undoubtedly result in due course. It is therefore unsatisfactory to credit to the steamer all the possible improvements on the horizon and only to look backwards where the internal combustion engine is concerned.

High-Pressure Steam Turbines.

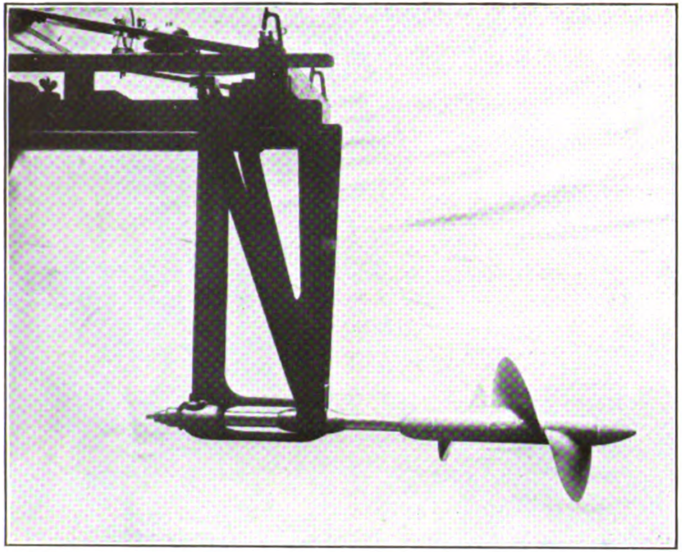
The development towards high pressures and temperatures with steam plant was foreshadowed last year in the writer's chapter to the "Annual." This path of development is rational and will undoubtedly lead to economies. It certainly may be some time before all the difficulties are surmounted. Water tube boilers require the perfection of very special precautionary measures to prevent the entrance through the condenser of any substantial amount of salt water. The introduction of high-pressure and high-temperature steam joints on shipboard demands much thought. The problem of high-pressure gauge glass and boiler mountings has to be solved. So potent are these factors that without a clear demonstration considerable scepticism may be felt. The King Edward — the first turbine steamer apart from naval vessels—is historical, and experience gained with this installation paved the way to the rapid adoption of the steam turbine for commercial marine application. A similar ship now being constructed, with high pressure and temperature turbines and boilers, must assist greatly toward the adoption of the new system by clearing away doubts, and by virtue of the experience gained, enabling development to take place much more rapidly along marine lines. This project shows an excellently bold spirit of initiative.

The profession is indebted to *Shipbuilding and Shipping Record*, September 3, p. 233, for the salient features of the new high-pressure installation to be fitted by the Parsons Marine Steam Turbine Co. to a new high-speed steamer to be built for the Clyde passenger service by Messrs. Denny, of Dumbarton. The machinery will be of about 4,000 s.h.p. The turbines will follow the usual two-shaft arrangement with gearing, but, of course, will be specially designed,

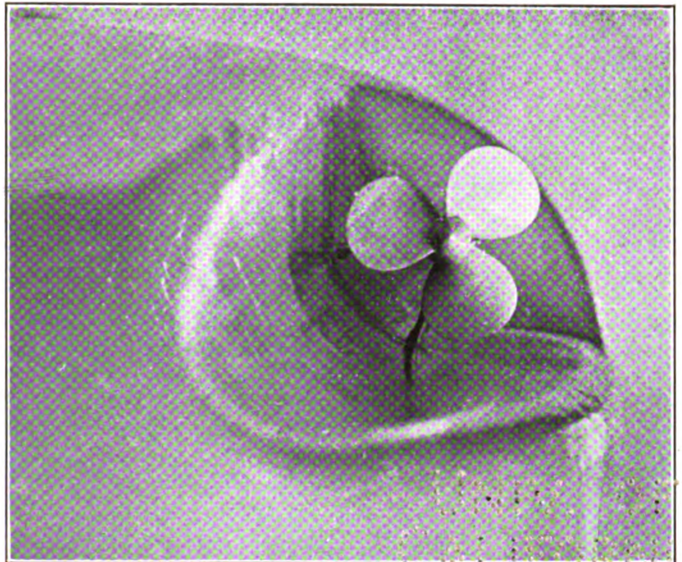


(*From "Shipbuilding and Shipping Record."*)

HULL MODEL ILLUSTRATING THE "DE MEO" SYSTEM OF PROPULSION WITH PROPELLERS AMIDSHIPS, WHICH IS CLAIMED TO REDUCE VIBRATION.



The special type propeller undergoing tests.



(From "Shipbuilding and Shipping Record.")

View of propeller, looking aft.

THE "DE MEO" SYSTEM OF PROPULSION.

as the steam pressure to be developed in the water-tube boilers will be from 500 to 550 lb. per square inch, at a temperature of from 700° to 750° Fahr. As suggested in Sir John Biles's paper, the condensers will be subdivided, and large surfaces will be provided to give a high vacuum. The two Yarrow boilers will be fitted with air preheaters, so that the installation embodies all the latest ideas advocated in the discussion on the paper referred to. It will be remembered that several boiler construction experts expressed confidence in being able to meet Sir Charles Parsons's ideas.

Another noteworthy feature is that the steam for the auxiliary machinery will be at a reduced pressure. The auxiliary exhaust steam will be utilised for heating the feed water to about 200° Fahr., but the temperature of the feed water will be increased to about 300° Fahr. by steam tapped off from a suitable stage of the turbines. As the steam pressure is double that of any existing marine installation, the development is one of the greatest in marine engineering for many years. The performance of this vessel will be eagerly anticipated and will be analysed with great interest, as it will give a great impetus to the adoption of turbines, especially for high-speed vessels.

There still remains a fairly wide field with the steam turbine installation in connection with the auxiliaries, where further economies can be effected. Air preheaters (see the "Annual" for 1924, p. 258) can give at least 5 per cent. extra boiler efficiency over forced draught installations. The Howden-Ljungström air preheater is now also made of the horizontal type with or without a fan. The electric driving of auxiliaries for both engine-room and deck duties has still to be fully explored. The use of the Diesel engine for this purpose, apart from the standard practice in the Navy, has yet to be adopted.

A new arrangement of propulsion of considerable interest to naval architects and marine engineers is that proposed by the well-known Italian naval architect Ing. G. de Meo, who has developed a scheme which might well be termed "central propulsion." In the course of his practice Mr. de Meo has been impressed by the amount of damage and the cost of repairs to passenger liners through vibration, due mainly, he believes, to the rotation of the propellers. To overcome this trouble he proposes to modify the design of the propellers and to fit them amidships, as shown by the illustration on the Plates facing page 214. A detailed description of Mr. de Meo's scheme appeared in *Shipbuilding and Shipping Record*, October 1, 1925, which described the advantage claimed by the inventor. These advantages may be described briefly as follows: elimination of vibration; elimination of considerable lengths of shafting with the necessary bearings; greater protection for the propellers; increased propulsive efficiency, and improved steering qualities. The scheme has distinct possibilities for passenger liners and for naval vessels, and it is hoped that we may hear soon of a vessel embodying the features described.

Motor Liners.

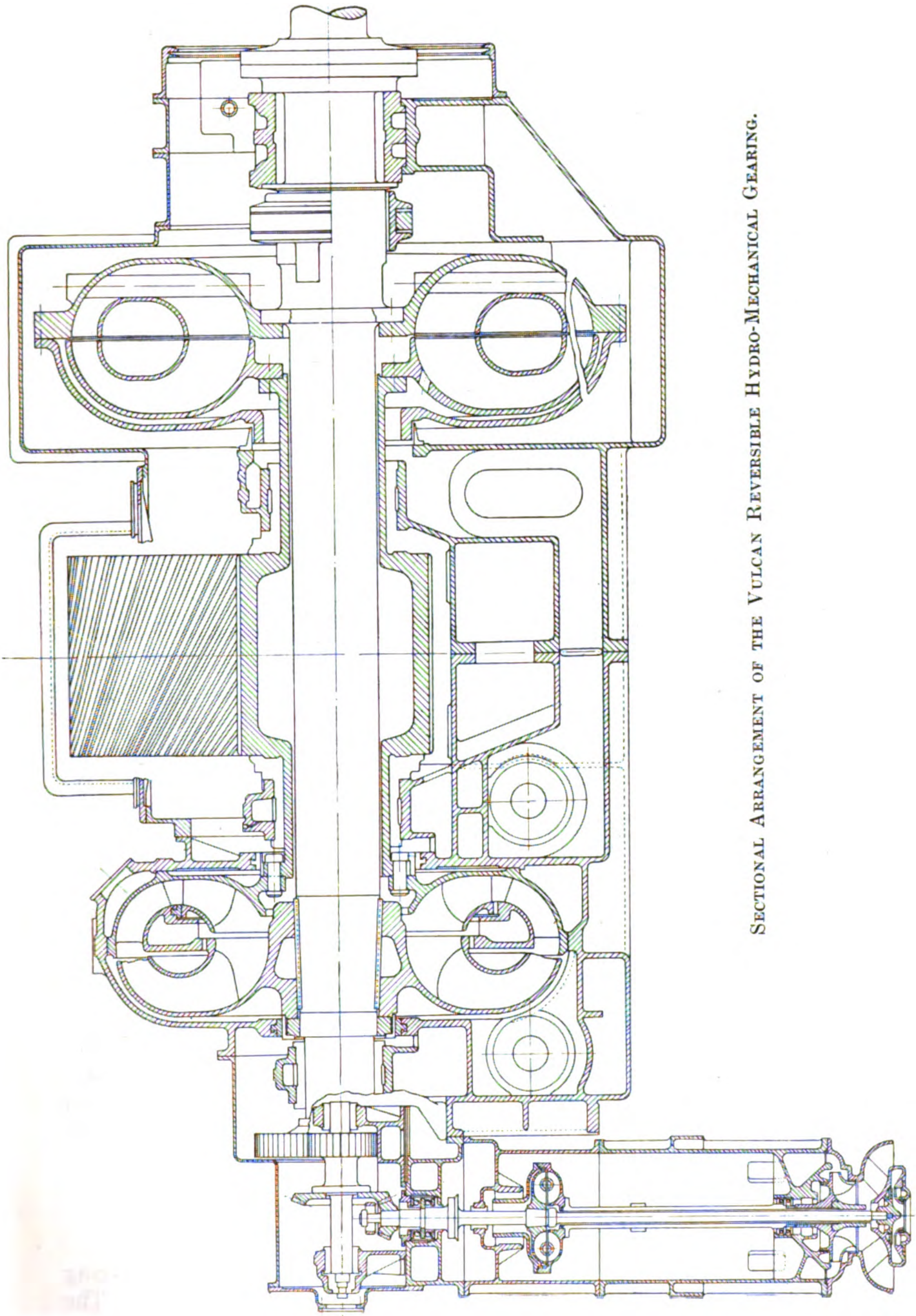
The success of the quadruple screw mail boat, the Aorangi, engined with four Fairfield-Sulzer engines, each of 3,250 brake horse-power (Plate facing page 218), stimulated motor passenger liner construction, and the large ships Gripsholm and Asturias, shortly to go into commission, will mark the commencement of a new era.

Labour troubles in the works at Copenhagen of the makers of the machinery of the Gripsholm caused delays which have given rise to a number of rumours in connection with these engines, which are, it is believed, not based on facts. A photograph of one of the two eight-cylinder 10,000 i.h.p. engines for the Royal Mail liner Asturias is reproduced on the Plate facing p. 220. These engines have completed most successful bench trials of an exhaustive nature in the makers' works at Belfast, and are now being fitted on board. The confidence of the owners who are adopting this form of propulsive machinery for their latest passenger liners is based on considerable experience of motor engines at sea.

The substitution of the even torque of the perfectly balanced rotary prime mover of small mass, the steam turbine, by the unequal turning moment arising from the rapid reciprocation of enormous masses involving unbalanced couples of some moment as in these large Diesel engines, is mechanically a retrograde step only justified by the much more direct thermo-dynamical cycle involved in the latter case. The combustion of the fuel within the engine cylinders involves thermal changes in the entrapped air directly convertible into work through the agency of the piston and crank. Is no compromise between these extremes possible?

Geared Diesel Engines.

The internal combustion turbine is not yet developed, so that high-speed reciprocating oil engines geared to the propeller shaft either electrically, mechanically, or hydraulically, are suggested. The advantages of high-speed engines are being more generally realized in many quarters, and the tendency with internal combustion engine work generally is towards a higher speed of revolution, so reducing the weight, the cost, and the space occupied. The speed of the propeller is largely a fixed quantity, so that for marine work gearing is required. Except for special purpose ships, the first cost and the transmission losses consequent upon electric transmission are a serious drawback to this system. Very complete trials have been carried out in America to compare two tugs, one with direct-coupled oil engines, the other having electric transmission. Substantial advantages in economy and efficiency of operation were indicated for the electric system; the motor on the propeller shaft being more readily adaptable than the direct-coupled Diesel engine to the varying conditions imposed as to whether the ship was running light, towing at full speed, or exerting the maximum pull or push at very small speeds. The extra cost of the electrical



Sectional Arrangement of the Vulcan Reversible Hydro-Mechanical Gearing.

equipment would be considerable, but whether the advantages are sufficient compensation even in this special case is not absolutely clear.

Small ships with Diesel oil engines geared to the propeller shaft in the same way as turbines, have proved successful over considerable periods of operation. Nevertheless, with the varying torque of the Diesel motor, and the necessity for reasonably constant turning moment to secure fair conditions of operation for the teeth of the gearing, a degree of flexibility in the coupling between the prime mover and the driven pinion is most desirable; indeed it may be said to be absolutely necessary.

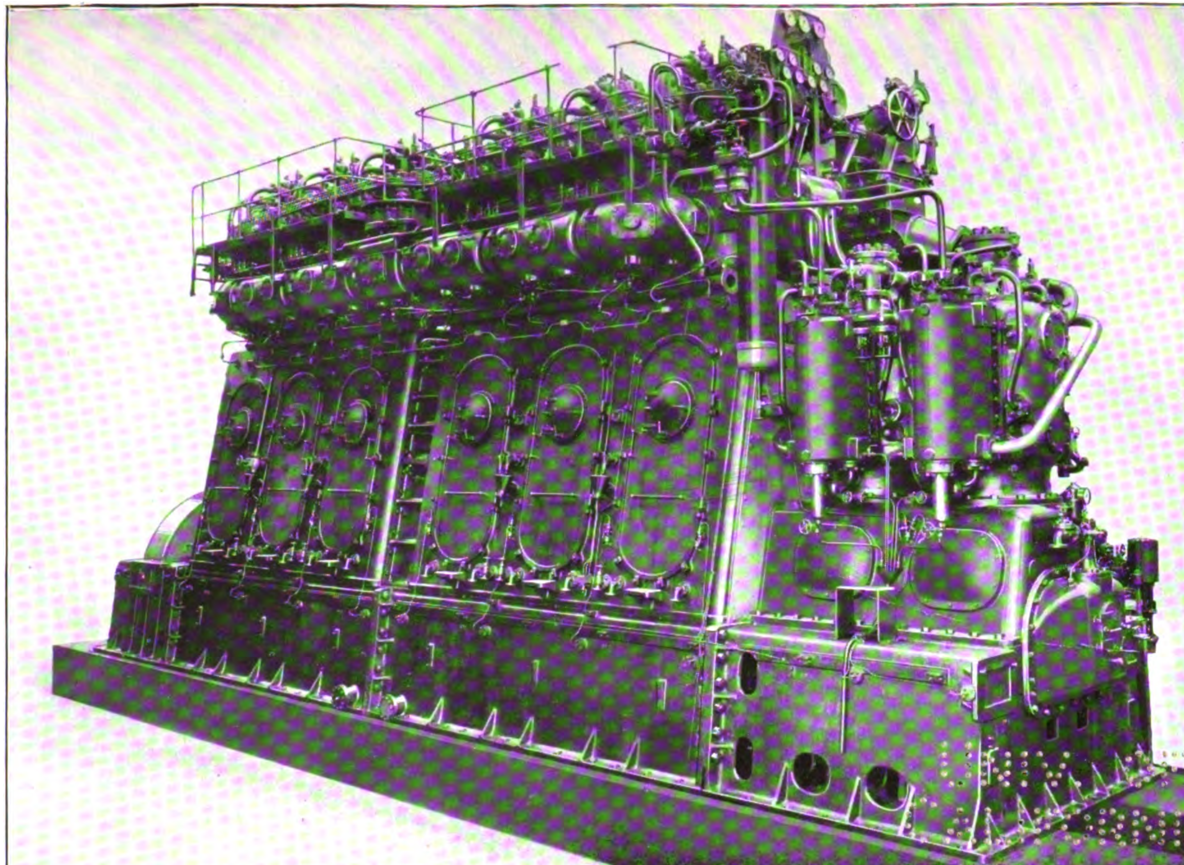
The Vulcan Gear.

The Vulcan clutch, the principle of which is shown on p. 217, has been devised to that end. This is an invention of Dr. Föttinger, adapted for marine work by Dr. Bauer. There is no rigid connection between the engine shaft and the pinion. On the end of the engine shaft is a dished element with vanes. On the end of the pinion shaft facing the engine element is a similar element with vanes. Oil circulated inside the casing around the clutch elements is forced through the passages between these vanes and acts as a coil spring would, and so the driven member is drawn round by the driver through the surface tension of the oil. The efficiency of this device is very high —of the order of 98 per cent.—and is represented exactly by the slip between the driving and the driven members, *i.e.* the driven member, the pinion, rotates 2 per cent. slower than the engine. By filling and emptying this clutch the drive is taken up or released, and so the engine can be kept running continuously, and the drive is taken up with perfectly gradual acceleration of the propeller without possibility of any shock, and is released similarly. This property enables the main engines to be warmed up always before leaving a dock or quay without moving the propeller—a very valuable provision indeed. It will also be readily appreciated that perfect alignment between the engine and gear casing is not in any way fundamental since there is considerable clearance between the driving and driven members of the clutch.

Reversing can quite equally well be carried out by the installation of an astern clutch, where the direction of flow of the oil through the moving vanes is reversed between the driving and driven members by passing through stationary vanes. Emptying the ahead coupling and filling the astern serves completely to reverse the direction of rotation of the propeller, whilst the prime mover runs at constant speed. Suitable pumps are provided to carry out the necessary clutch filling and emptying operations.

Manœuvring with Hydro-Mechanical Gear.

This system is better in flexibility and speed of manœuvring than has ever before been attained with any previous drive. The propeller can be slowed down as rapidly or as slowly as desired to any speed by reducing the speed of the prime mover and then



ONE OF THE FOUR SIX-CYLINDER FAIRFIELD-SULZER TWO-STROKE CYCLE DIESEL ENGINES OF THE MOTOR LINER AORANGI.

(*Constructed by the Fairfield Shipbuilding and Engineering Co., Ltd., Govan.*

partially emptying the coupling of oil. The writer has made several trips with ships employing this system, and can speak from personal experience of its flexibility. So far as can be seen, heard, or felt, the gearing operates as if driven at absolutely constant torque.

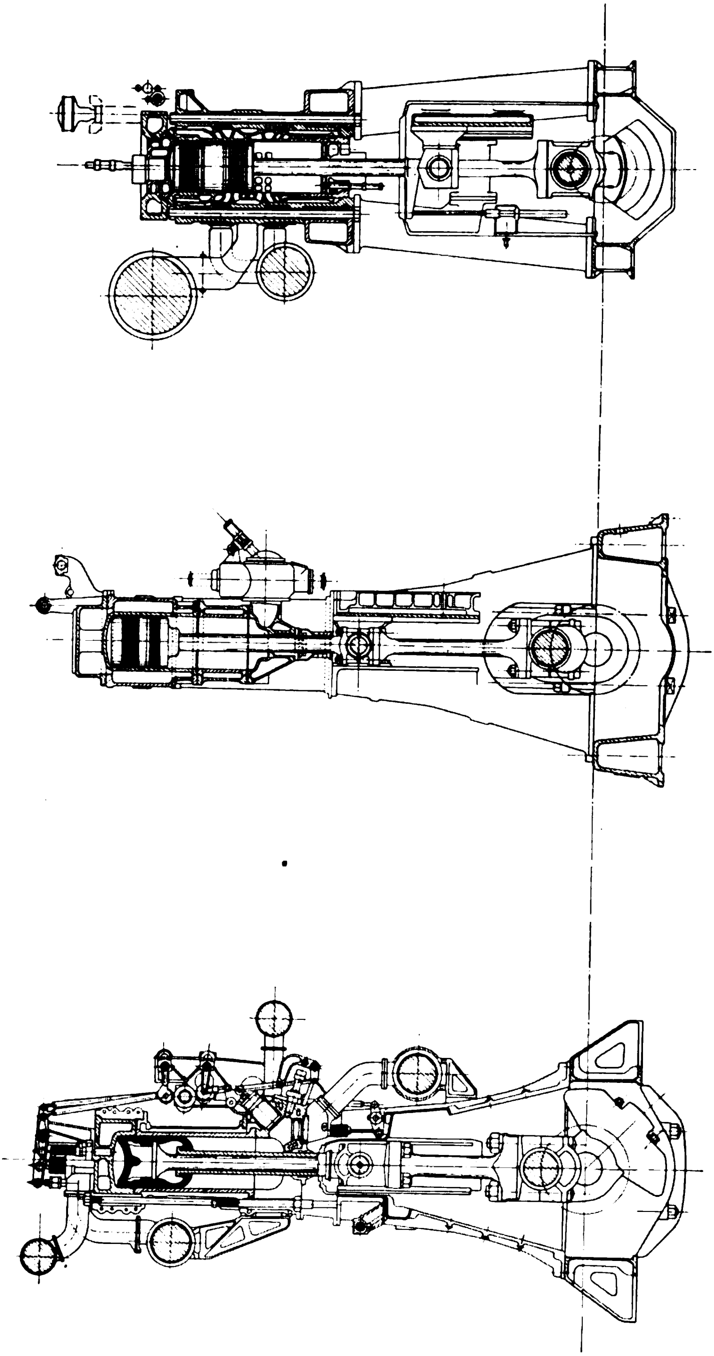
The interposition of suitable Michell thrusts will be seen from the drawing on p. 217. Single helical gear suffices since the thrust consequent upon the angle of the helix is reasonably balanced under all conditions by the oil pressure within the clutch casings. The elements, then, of the arrangement are moderate speed Diesel engines running with standard piston speeds and normal mean pressures, clutches filled and emptied with lubricating oil, and a single reduction single helical speed gear box with a small reduction ratio of from 2 to 4 : 1.

In this way economy of space and particularly head room—most valuable for passenger ships—results. High powers per shaft are immediately practicable, utilizing only well tried-out units for the main engines. The reciprocating masses are reduced to approximately one-quarter of those necessary with direct-coupled motors. The failure of one unit has a smaller influence on speed. One engine can be stopped to make adjustments without stopping the propeller. Overhauling and maintenance are simplified due to the much smaller masses to be handled. The engines can be warmed up before moving ship. The excessive consumption of starting air required to get a cold engine under way is obviated. Risks of losing air are reduced to a minimum.

The highest powered single-screw motor ship afloat, the motor ship Duisburg, is engined with two eight-cylinder four-stroke-cycle single acting engines developing a total of 4,000 brake horse-power on a single screw, and is now in the Far East, having completed a most successful maiden voyage. A large number of motor ships have been built or are building, principally in Germany, with this system of propulsion, all being single-screw vessels. Application to large passenger liners where space, head room in particular, as well as weight, can be saved may be anticipated. The type of prime mover to be adopted by this system is in no way rigidly fixed, and the flexibility permits, in fact, of a broader spirit towards the adoption of the latest type of prime movers—the double-acting engine. A number of liners and large cargo carriers are now in construction, having the three types of double-acting engines as propelling units. These are illustrated in the figures on page 220. For the dimension of the cylinders of these engines reference might be made to Table II., p. 223, of last year's "Annual."

Large Italian Motor Liner.

A notable addition is the Augustus, the largest liner under construction in the world, of 30,000 tons displacement, being built by the Ansaldo Company in Genoa, to the order of the Navigazione Generale Italiana, Genoa. The propelling machinery will comprise four double-acting two-cycle engines of the M.A.N. type, each of 6,250 b.h.p. continuous rating at 120 r.p.m. ; 7,000 b.h.p. at 125

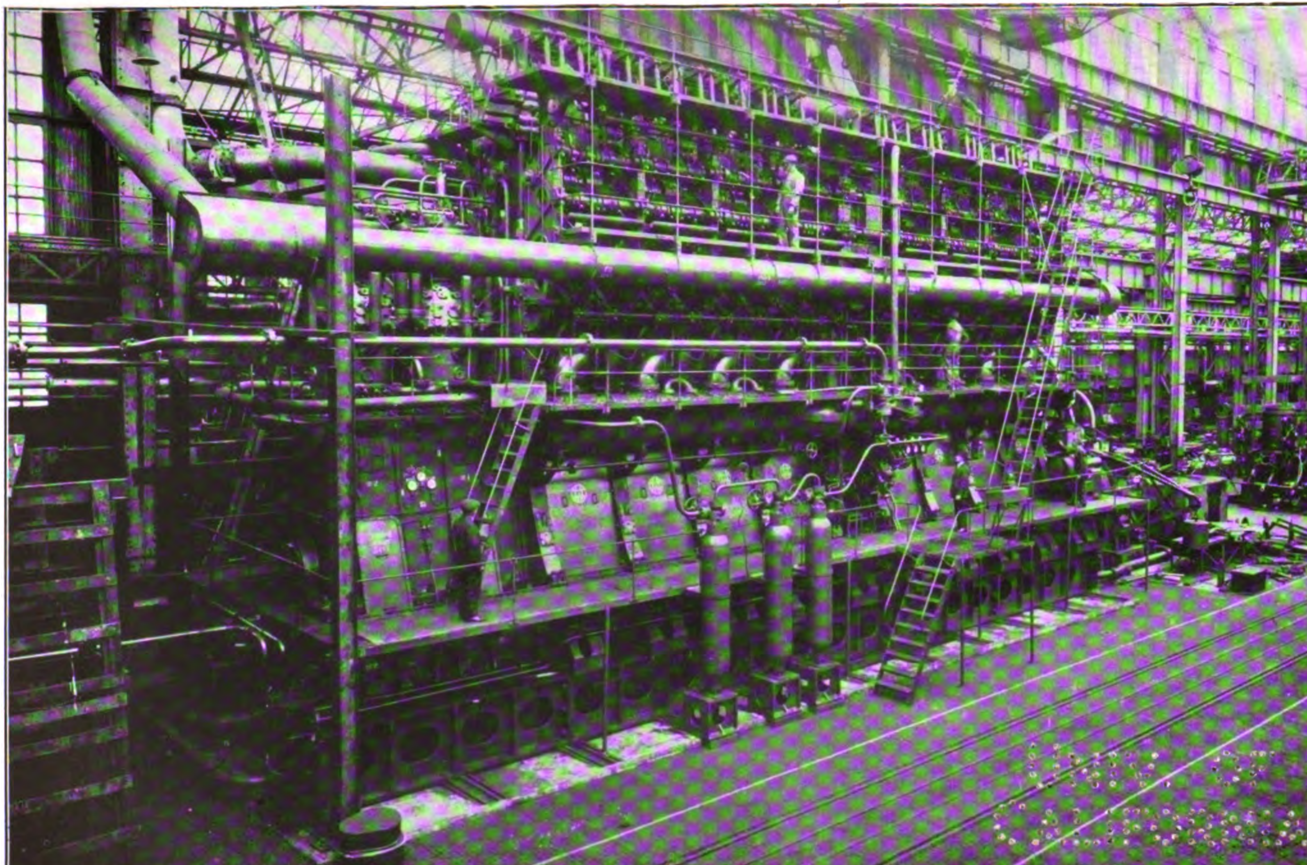


Double-acting, 4-cycle Engine.
Burmeister and Wain.

Double-acting, 4-cycle Engine.
Werkspoor.

Double-acting, 2-cycle Engine.
M.A.N.

TYPES OF DOUBLE-ACTING MARINE DIESEL ENGINES.



ONE OF THE EIGHT CYLINDER FOUR-STROKE CYCLE HARLAND & WOLFF-BURMEISTER & WAIN DOUBLE-ACTING DIESEL ENGINES FOR THE ROYAL MAIL LINER ASTURIAS

(Constructed by Harland & Wolff, Ltd., Belfast.)

revolutions per minute will be the trial performance. Each of the four main engines will have six cylinders of $27\frac{1}{2}$ inches diameter by $47\frac{1}{4}$ inches stroke. The illustration on p. 220 shows the type of main engine to be installed. The diagrams on p. 220 also show respectively the Burmeister and Wain and the North - Eastern Werkspoor design, and the leading characteristics will be observed.

THE SUCCESS OF THE DOUBLE-ACTING ENGINE.

The double-acting Diesel engine has definitely come to stay. For low and moderate powers, the simplicity and ease of access and overhaul of the single-acting engine will prevent its supersession, at any rate for some considerable time, up to probably 2,000 to 2,500 brake horse-power per engine, although exactly where the dividing line may lie cannot be forecasted with certainty. Above this power, all marine motors of the future will be double-acting, working either on the two- or the four-stroke cycle principle. In connection with this latter, supercharging is the latest and most logical development. Supercharging is an unfortunate name, borrowed from aeroplane and automobile practice, and has given rise to doubts as to the advisability and efficiency of this new development. The supercharger might well be termed a combustion chamber cooler, and regarded as a means of supplying an extra quantity of air to the combustion cylinders, so reducing the temperature of the containing walls and particularly of the exhaust valve or valves. If it is required to take advantage of this extra air in order to burn more fuel within the cylinder and so to develop more power, then this may be readily achieved to the extent of at least 10 per cent. extra power, without in any way raising the temperatures and, consequently, without augmenting the heat stresses in the important parts of the engine beyond those consequent upon the normal rating of the engine without supercharging. Therefore ships fitted in the future with superchargers, whilst running at or about normal rating, will probably use the supercharger as a means of extra cooling.

The supercharger, which is usually a high-speed blower, electrically driven, of quite a small size, delivering the combustion air to the engines at a very small pressure, is not absolutely necessary for the running of the engines; but development along these lines, together with the higher piston speeds, which it is proved now with the four-stroke cycle engine can be sustained, have succeeded in reducing the cost, weight, and space occupied to such an extent that the advantages of the two-cycle principle in these directions are slight if not entirely superseded.

The battle of the two cycles still continues. The great mass of Diesel engine construction going forward the world over still adheres to the earlier and better tried-out system. Such, however, is the technical competition at the present time, in which Britain is playing a very important part, that rapid developments can be forecasted for the relatively near future.

JAMES RICHARDSON.

CHAPTER IX.

The Balance-Sheet of the Motorship.

To the observer it may well appear that no more important and intriguing question confronts the shipowner who sees his way now to place contracts for new tonnage than whether he should decide for motorships or steamships. Judging by the construction of the last few years and that which is now proceeding, the question is not to be answered without much thought and study of individual circumstances. Three new liners of 20,000 tons each to be driven by steam have just been built for the Orient Line's service between Great Britain and Australia. Two ships of over 20,000 tons each, also to be driven by steam, have been built for the P. & O. Company's eastern service, and a number of fine steam-driven liners of not quite such great tonnage have been constructed lately for the same company. Against this output of steam tonnage there is the Aorangi, of 17,500 tons, which, early in 1925, took her place in the trans-pacific service of the Union Steamship Company of New Zealand; and the Asturias, of more than 20,000 tons, another motorship, which was launched for the Royal Mail Steam Packet Company last summer, and is to be followed not only by a sister ship for that company's service, but also by a vessel of similar size for the Union-Castle Mail Steamship Company. During the past few months the Gripsholm, of 16,500 tons, has been in course of completion in England to the order of the Swedish-American Line. All these companies have had at their disposal expert advice. Yet, it will be seen, different decisions have been made respecting the choice between steam or motor engines.

Tonnage under Construction.

On June 30 last there were, according to the returns of Lloyd's Register, the following tonnages of steam and motor vessels under construction in Great Britain and Ireland and abroad. It will be observed that whereas, in numbers, the steam vessels being built were more than double the motorships, the actual motor tonnage under construction abroad exceeded that of the steam tonnage. The motor tonnage actually equalled more than 93 per cent. of the steam tonnage under construction throughout the world, while in Great Britain and Ireland the motor tonnage represented about 58 per cent. of the steam tonnage.

Class of vessel.	Vessels under construction. In Great Britain and Ireland.		In other countries.		In all countries.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
All vessels	273	1,093,587	401	1,276,244	674	2,369,831
Steam vessels . . .	196	687,607	210	524,918	406	1,212,525
Motor vessels . . .	58	399,070	141	730,842	199	1,129,912

As indicating the nature of the choice, comments made by Sir Frederick Lewis, the Chairman of Furness, Withy & Company, Limited, at the annual meeting at the end of July, deserve to be quoted. He pointed out that the fleet, including the vessels owned by the associated companies, then amounted to more than 1,000,000 tons, of which 100,000 tons consisted of motorships. Part of the tonnage then under construction was to be driven by Diesel engines and part by steam engines. This did not mean, he said, that the management was dissatisfied with its experiments with Diesel engines, but the fact was that, taking everything into consideration, the steam engine was still the most economical in certain trades, particularly in short voyages and deadweight trades, and in trades where oil was expensive. He proceeded :

> We have amongst our fleet five different types of Diesel engines, and, notwithstanding the fact that it is now some thirteen years ago that we constructed our first vessel with British-built Diesel engines, we are still more or less in the experimental stage, and one of the most important factors standing in the way of further development and use of the Diesel engine for marine purposes is the very high first capital cost. Apart from this problem, which will, no doubt, be solved in due course, and also the question of the cost and supply of oil, our experience leads us to the conclusion that the efficiency of the Diesel engine is firmly established.

These two points were also raised by Lord Kylsant at the meeting of the Royal Mail Steam Packet Company, in June, when he said :

> There are two factors at the present time which are tending to hold back the more general adoption of motorships in place of steamships—namely, the uncertainty of obtaining, and at reasonable cost, the necessary supplies of oil ; and, secondly, the present relatively high first cost of motor engines compared with steam engines.

In a later passage he declared :

> Although opinions may differ as to the practicability of reducing the first cost of high-class marine motor engines, I cannot help feeling, with the wonderful example before us, of the inexpensive manufacture of motor-car engines by methods of standardization, that to a lesser extent, the application of similar principles to the construction of marine motor engines might make it possible in the not far-distant future to produce a first-class motor engine at a considerably lower cost than at present.

Now it may be stated that the first cost of an internal combustion engine is, broadly, from 30 to 40 per cent. above that of the cost of a triple expansion reciprocating steam engine of similar power. The higher cost of the production of the motor engine is largely accounted for by the facts that while steam engine and boiler materials are made

universally, experienced steam engine labour is abundant, and patterns exist for nearly every size and type of steam engine in practically all engineering shops; there are in the manufacture of Diesel engines few makers of the special castings necessary for the work, while experienced and skilled Diesel engine labour is scarce, and the cost of patterns for each new size and type adds appreciably to the cost of each motor engine produced. Steam turbines being more expensive to build than reciprocating engines, the difference in cost between a Diesel engine and a steam turbine is not quite so great, but it is still marked.

Higher Cost of Diesel Engines.

It should be remembered that comparisons can only be made strictly between the respective costs of internal combustion and steam engines, and cannot be drawn, generally, between complete motorships and steamships. The proportion of the price which an engine bears to the total cost of the fully-equipped vessel naturally varies with the power of the engine in relation to the type and size of the ship it propels. In one large and valuable type of vessel the cost of the hull and equipment, apart from the propelling machinery, may represent 80 per cent. of the whole cost, leaving 20 per cent. as the charge for the low-powered engine. In another and higher-powered vessel the small and inexpensive hull may represent 40 per cent. of the total cost, and the machinery 60 per cent. Actually, in the case of a very fast torpedo boat destroyer, the machinery may represent as much as 90 per cent. of the whole cost, leaving only 10 per cent. for the price of the hull and equipment, apart from the propelling machinery.

Assuming, however, that the costs of the hulls of motor and steamships are to be the same, and taking the cost of the hull of a steamship to be of equivalent value to that of its engines, and also premising that the engines are to be of the same power, the increased cost of the motor engine, spread over the whole of the ship and her equipment, will raise the cost of the motorship by from, approximately, 15 to 20 per cent. It will be seen that, in making any comparison, much has to be assumed. The result means that the owner must calculate on higher earnings to meet the interest on the larger capital invested. These higher earnings might be needed to pay the interest on a larger bank advance, or on more debentures, or on an increased share capital. He must also calculate on allowing for annual depreciation on the larger sum invested, and likewise on paying, similarly, for more marine insurance. An addition of from 15 to 20 per cent. to a sum which was already considerable, will be notable.

Interest on Larger Capital.

Consequently, in order to provide for these additional outlays and a return on the increased value of his investment, it will be necessary for the owner to secure the maximum earning capacity

from the vessel and, in any case, a greater return than from an investment in a steam vessel of equivalent capabilities. An instance of a trade which would be most suitable for a motorship would be a long distance one, since the idle time spent in port, while the ship would be earning nothing, although incurring charges in respect of the increased capital, would be much less than in the case of a vessel which was making short voyages and spending more than half her time in port. The special advantage of the internal combustion engine is, it should be remembered, economy of machinery working. Broadly, a trade where short voyages only were being made would be unsuitable for an expensive motorship. It is significant that the Glen Line which, out of a fleet of eleven vessels, owns eight motorships, is engaged in the long distance trade between the United Kingdom and the Far East. No doubt the terms on which this company may be able to obtain its oil there is an important factor in its steady support of motorships; but, in taking into account the higher first cost of motor engines, every owner must consider the actual earning capacity of the vessel. That necessarily depends, to a large extent, on the proportion of the time spent during the course of a year in actually earning passage or freight money, *i.e.* the time during which the ship is at sea carrying passengers or cargo.

Following this line of argument, internal combustion engines would not be given their best opportunities for recording economy of working in short distance cross-Channel routes, as the value of the economies effected by the motor engines during only two or three hours at sea out of the twenty-four, would normally be more than balanced by the capital charges expended during the idle period of many hours in port.

Comparative Costs of Fuel.

If the case be taken of an owner who has faced the first higher cost and has ordered a vessel for a trade in which he will be able to secure all the advantages of the internal combustion engine, it will be interesting to see how he would fare. A great deal will depend, as the leading owners quoted at the beginning of this article have indicated, on the cost of fuel. It may be assumed that the motor engine consumes 3½ tons of oil, as compared with a steam engine of equal power which consumes 10 tons of coal, or 6½ tons of boiler oil. The question of costs of fuel depends, naturally, on varying factors. Before the coal crisis of last summer coal could be bought in the United Kingdom at about 20*s*. a ton. The price advanced to about 30*s*. a ton. The price of Diesel oil during the period was in this country about 90*s*. per ton. Since 10 tons of coal would cost 300*s*., and 3½ tons of Diesel oil would cost 315*s*., it will be seen that there was not, during the coal crisis, much between the comparative costs of coal and oil. I have, however, been told that one company, in an endeavour to grapple with the problem of oil prices, has long been able to secure in the producing country what is known as "fabricated oil," consisting of Diesel oil and heavier boiler oil, at 40*s*. a ton. In that case the bill for oil would be considerably

cheaper than for coal. Prices of boiler oil and Diesel oil seem to be regulated very closely in most ports of the world in accordance with a prevailing local price of coal, and the fact that, in the United Kingdom, coal can, in normal times at any rate, be secured in large quantities, is no doubt a consideration in restricting the price of fuel oil. On the whole, it seems very doubtful if, although the consumption of oil would be so much less than that of coal, an owner, unless he were able to make special price arrangements, could rely on much saving in that direction.

The Wage Bills.

Sometimes it is stated that the wage bill of a motorship should be much below that of a steamship, and particularly of a coal-fired steamship. There is certainly a saving, in a motorship, in the number of firemen and trimmers required, but against this economy there need to be employed more engineers and greasers per horsepower developed, while as Diesel engineers have the reputation of being more highly skilled than the steam engineers, their rates of pay are, as a rule, larger. So, again, it is doubtful if, owing to the more highly skilled type of men employed, any considerable saving in the wage bill can be expected in the motorship. Incidentally, the demand for skilled motor engineers now seems to exceed the supply. It would appear that the motorship has not been sufficiently long in service—the great development has occurred since the war—for the number of motor engineers with sea experience to keep pace with the demand for them. The profession of the marine motor engineer is one of those in which there is now no unemployment, and most shipowners arrange for their engineers to go to the works where Diesel engines are being built, in an attempt to increase the numbers of highly skilled marine motor engineers, and thus keep pace with the demand for them.

The cost of maintaining motor engines in service is heavier than that of reciprocating engines, particularly when repairs have to be effected abroad, where experienced Diesel engine labour is scarce. Further, a motor engine demands a larger use of a more costly lubricating oil than is required for a steam engine.

Measurement Cargo in Motorships.

Although there is little saving in cost to be expected from the use of Diesel oil in motor engines, as compared with coal or boiler oil for steam engines, and little advantage to be expected in the victualling and wages bills, the motorship of similar gross tonnage to the steamship has more space available for the carriage of what is known as measurement cargo, since the motor engines occupy slightly less space; the bulk consumption of fuel, calculated in cubic feet, is smaller; and the Diesel oil may be carried in the double bottoms and such other spaces which are, as a rule, useless for the stowage of cargo. The motorship will, therefore, be especially serviceable in routes in which general cargo of a bulky nature would

be carried. A motorship may be able to carry as much as 70 cubic feet to the ton deadweight, as against a maximum of, say, 60 cubic feet for a steamer. Comparing motor and steamships of 10,000 tons deadweight, the motorship would, therefore, on that basis, be able to carry 100,000 cubic feet more than the steamer of corresponding size. Provided that she can be employed in trades where advantage can be taken of this additional carrying capacity for the greater part of her life, the motorship should thus have a much larger earning capacity.

The merits of a motorship engaged in carrying deadweight cargo only are not so apparent. An example of such a trade would be that of a vessel employed in carrying coal to South America and bringing back grain. The advantage which she would there have over the steamship would be mainly that of the smaller weight of the fuel she would need to carry. There is very little difference between the actual weights of the machinery of motor and steam engines. The motor engine may even be the heavier of the two.

Increased Sailing Range.

Although the motorship may not seem to have great merits over the steamship for the ordinary "tramp" owner, it may often be possible for her to avoid the deviations for bunkering purposes which are sometimes necessary for the steamship. Since coal bunkers absorb a large amount of space, the distances which ordinary cargo vessels can steam without replenishing their bunkers are limited, and, although coaling stations exist on all trade routes, it may often be necessary for a tramp steamer to go some distance out of her way to bunker. She would also spend time taking in coal and, occasionally, she may have to wait some days before being able to do so, while the cost of maintaining the vessel in service, including wages, continues. The motor vessel, on the other hand, needing less fuel and being able to stow much of what she does need in places that would not otherwise be used, acquires a much greater sailing range without taking in fresh supplies of fuel, and, when she does bunker, oil can be pumped into her in a very short time as compared with the slow and costly work of bunkering and trimming coal.

Many of the motor cargo vessels which have so far been built have been intended for trades where it is known that oil could be secured comparatively cheaply at ports convenient to their routes, and within their normal sailing radius. Great progress is being made with the construction of storage tanks for oil at most ports on the principal trade routes, and this increase in the number of oil depôts should much encourage the construction of motor vessels, if the prices of oil are steadily maintained on reasonable levels.

Recent Developments.

Of the eight large Glen liners all but one have been built since the war—the exception was completed in 1916. Before the war there

were a number of experimental ships. The Eavestone, built some thirteen years ago by a British firm with a Belgian type of engine, was one of these. Shortly before 1914 builders and owners were trying to discover if there was any satisfactory alternative to the reciprocating steam engine, and steam turbines began to be built on a considerable scale for marine purposes. The turbine engine, including the geared turbine, has not, in every case, proved economical, especially in maintenance and repairs, and, after the war, a number of motorships each developing about 3,500 horse-power, were constructed, but this horse-power was not sufficient for large and fast passenger ships. It is really only now that large passenger motor vessels are beginning to be built.

Three years ago two important attempts were made to construct vessels of this class. One of the ships built was the Aorangi, of 17,500 tons, designed by Messrs. William Esplen, Son, and Swainston, Limited, for the Union Steamship Company of New Zealand. The principle of the machinery of this vessel was that she should have four engines each developing 3,500 horse-power, and each driving a propeller, so that the total horse-power was 14,000. This was by far the largest horse-power for which any motorship had then been built. One merit of the arrangement was that, with four engines, the risk of a complete breakdown was very greatly minimized. Another advantage was that the height of these four small engines was relatively low and did not interfere with the passenger accommodation, while the adoption of four engines involved a minimum amount of vibration. The experience with the Aorangi has been, I am assured, that there has been no more vibration than in a ship driven by turbine engines and little more than in one fitted with reciprocating engines.

Foreign Construction.

One interesting feature of the Aorangi was that the engines were of the Fairfield-Sulzer type. They were built in this country by the Fairfield Company under licence of the patents of the Sulzer Company, of Winterthur, Switzerland. It is a far cry from Lake Zurich to the Pacific Ocean, but one of the outstanding points in the construction of marine motor engines is that Continental firms have been, and are, to the front in inventing, developing, and constructing them. The Sulzer Company has long built powerful motor engines for land purposes, and later, when it became apparent that motor engines were to be largely adopted at sea, the company began to build marine engines.

The Danish Burmeister and Wain engine is now much used in this country. There are, though, many types of marine internal combustion engines. Some of these are of British origin. Yet it is significant that, whereas every steam engine for a British ship would have been designed in the United Kingdom, the plans of many of the internal combustion engines for British ships are of foreign origin.

The Gripsholm, already mentioned, which has been built by the Armstrong, Whitworth Company, is fitted with Burmeister and Wain

engines. In some respects the Gripsholm may be regarded as a more striking type of ship than the Aorangi, for she has only two engines, and each is of a size which has not yet been tried at sea. There have been delays in her completion, and the seagoing experience of the vessel will be watched with the greatest interest. Similarly, the new Royal Mail and Union-Castle liners, with engines of almost similar design and size, will be pioneer ships. On the experience with all these ships will largely depend the method of propulsion to be adopted in the construction of great passenger liners in the early future. It was, no doubt, because the first great internal combustion engine liners, with their large horse-power and powerful motor engines of a new and perhaps untried type, are to a certain extent experimental, that some leading companies have preferred, for the present, to continue to build large passenger steamers, pending the proof, in actual practice, of the trustworthiness of internal combustion engines for the purpose.

The Choice of Auxiliary Machinery.

Associated with the choice between the types of main engines is that of the selection of the description of auxiliary machinery. The question of the comparative advantages of motor generators with electric auxiliaries again depends largely on the proportion of time during which these auxiliary engines will be in use in relation to the time that they are idle. If this machinery is to be frequently employed, motor generators with electric auxiliaries would probably justify the additional capital expenditure entailed.

A ship spending most of her time in port and using auxiliary engines for the loading and discharging of cargo, and very little time at sea between neighbouring ports, would probably show most economy if fitted with inexpensive steam engines and boilers for propulsion at sea and motor generators with electric auxiliaries for use in port. On the other hand, for long distance express liners, internal combustion engines for propulsion and steam-driven auxiliaries for use in port, might be expected to prove the most economical choice.

Many of the steamships which are now being built are to be fitted for the burning of fuel oil in place of coal, and large passenger liners which burned coal have been adapted for the burning of fuel oil. Since the usual ratio of the two kinds of fuel oil is in the proportion, broadly, of 6½ tons of oil to 10 tons of coal, no economy in the actual cost of the oil is to be expected. There is, however, a saving of firemen and trimmers—and in the case of high-speed liners a very appreciable one—which is not countered, as with internal combustion engines, by the necessity for employing a larger number of skilled and better paid engineers. Reckoning the saving of time in taking in oil and the cleanliness, as compared with coal bunkering, there can be no doubt that in passenger liners oil has a great advantage over coal. It needs to be remembered that experiments are constantly being made with a view to building steam turbines and boilers with a very high working pressure in an

endeavour to compete with internal combustion engines. So far the difficulties, particularly with regard to the condensers, have proved abundant, and it is hardly to be expected that such progress will be made in this direction as will overtake that already made in internal combustion engines or to keep pace with the improvements which, doubtless, will continue to be made in this comparatively new type of machinery.

Sufficient should have been written to indicate that the present is an extraordinarily interesting and important period in the development of marine engines; that much will depend on the forthcoming results of putting theories into practice; and that, in choosing particular types of engines, owners will need to study the particular circumstances of their trades which, it has to be recognized, may even change after their decisions have been taken.

CUTHBERT MAUGHAN

CHAPTER X.

Latest Developments in the Wireless Apparatus, etc., of British Merchant Ships.

The most marked development in the wireless equipment of British merchant vessels is the steady increase in the number of vessels fitted with valve receivers. At first sight this does not seem to be a very important development, as the range of inter-ship and ship-to-shore communication was sufficient for most purposes when crystal receivers were in almost universal use, but the real advantage to be gained by the increase of valve receivers is the facility which is given for reading time signals, weather reports, and other long-distance messages transmitted by means of continuous waves.

The use of valve receivers has, of course, improved the inter-ship and ship-to-shore service by increasing the possible range of communication, but at the same time the increased sensitiveness of reception also intensifies interference from other signals. In crowded waters the introduction of more sensitive receivers does not very greatly improve the communications, as increased interference goes a long way to counteract the improvement in signal strength.

The growth of the use of valve receivers also brings nearer the day when it may be possible to abandon the use of spark transmitters. While crystal receivers remain it is impossible, in the interests of safety of life at sea, to abandon the use of spark transmitters, for other types of transmission of a less interfering nature, because the crystal is comparatively insensitive to transmissions other than the spark. In this connection it is the pioneer of improvement who suffers, for if he fits his ship with, say, an interrupted continuous wave transmitter, he may do something towards decreasing the amount of interference caused by his ship's transmission, but he will make his own communications definitely worse by reducing the range at which he can communicate with those other ships, still in the majority, which have not got, or do not habitually use, valve receivers.

If the use of valve receivers becomes universal, and if all ships are fitted with transmitters of less interfering properties than the spark, then there is every possibility and prospect of greatly improved communication; but while crystal receivers remain the spark transmitters cannot be dispensed with without disadvantage to the pioneers, and while spark transmitters remain in large numbers no benefit to the user can be obtained by fitting less interfering types of transmitter. No doubt the gradual replacement of spark transmitters by apparatus of a less interfering nature would benefit other services, especially those concerned with the reception of broadcast

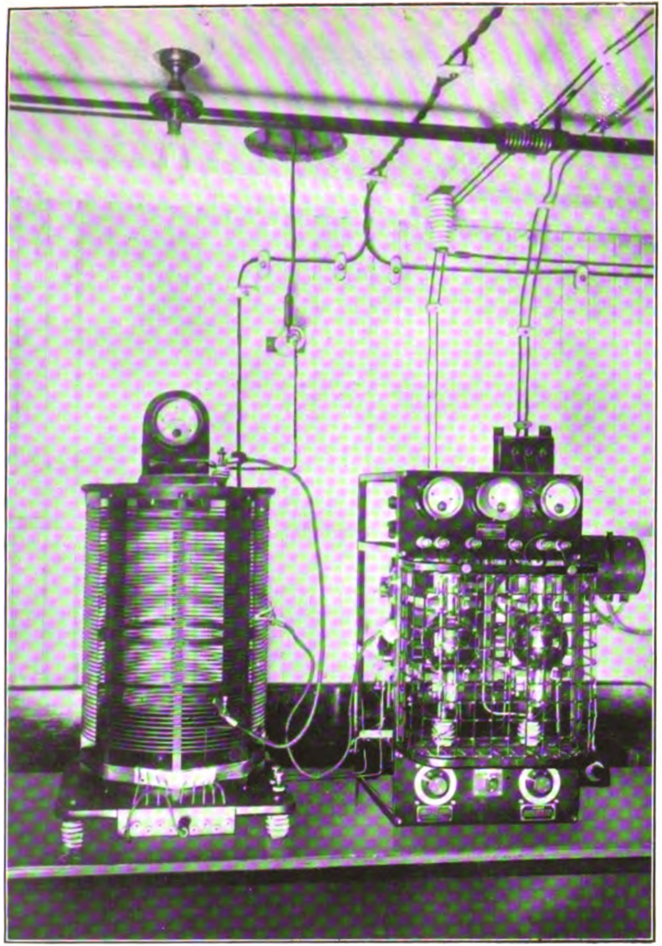
concerts, etc., but it is to the detriment, not to the advantage, of the pioneer. There are many places where the great majority of the shipping is of comparatively local nature, where some advantage may accrue to the pioneers who depart from the ordinary spark transmitter; but for ocean-going vessels trading all over the world, the general statements made above represent the present-day facts.

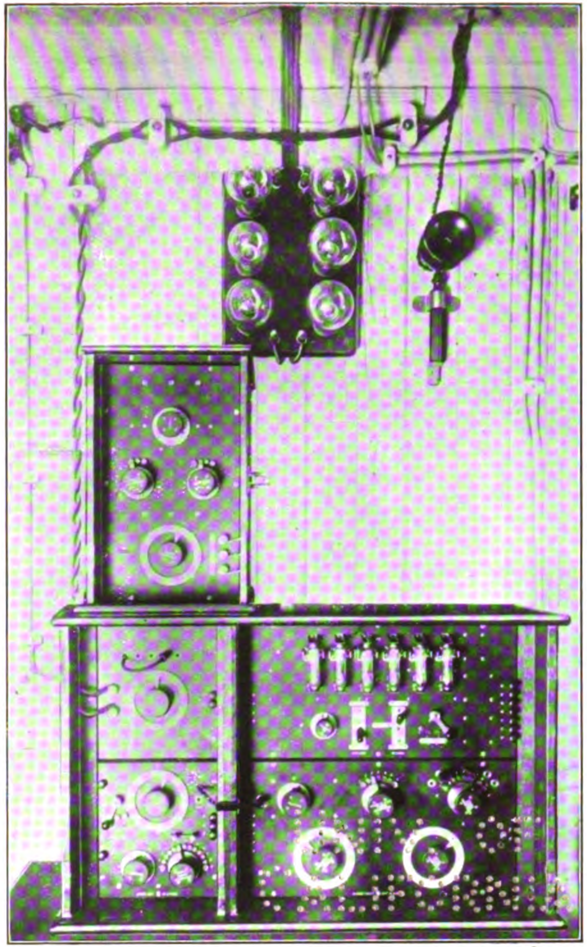
The steady increase in the number of ships using valve receivers, and the corresponding improvement in the proportion of vessels carrying up-to-date and powerful transmitters, either spark, continuous wave, or both, has brought about a steady improvement in the communications both of the "long-range" ships themselves by direct communication, and of the smaller vessels by relaying messages to and from them through the better equipped ships. The free use of long continuous wave transmission by the large passenger vessels has done a great deal towards relieving the more usual medium length spark waves of the heaviest traffic, and especially is this the case in such crowded waters as the approaches to the English Channel and the approaches to New York.

Telephonic versus Telegraphic Communication.

A great number of experiments have been carried out with a view to improving the communications of ships. In the first place, the problem of telephonic as distinct from telegraphic communication has been threshed out, and the results may be expressed as follows: If simplex telephony is used—that is to say, if the persons conversing switch over from talking to listening—the problem is technically easy, but no progress is made. Such a method cannot be connected to any ordinary land telephone system, and therefore direct conversation between parties is impossible, and the whole method of communication is much slower than by telegraphy. It must be realized that messages must be written down—not delivered verbally—and this necessity robs telephony of all its apparent speed in comparison with telegraphy. Also the apparatus required is more expensive than that necessary for telegraphy.

Duplex telephony—when a conversation is carried on in the same way as with an ordinary desk telephone—is technically possible, and such a system can be linked to the ordinary shore telephone system. This gives the advantage of direct conversation between the interested parties, but two great practical difficulties remain. In crowded waters the interference from and to other services is so great that the speech cannot be considered as commercial, and the cost of special stations on land for the purpose of maintaining such a service is so great that the commercial and economic success of such an arrangement is improbable. Again, not only is the expensive duplex apparatus required on board ship as well as on land, but if the ship's ordinary telegraphic traffic has to be interrupted to allow of the telephone conversation being carried on, the ship's communications are made worse instead of better. Therefore, still further expense is involved in fitting the wireless telegraph apparatus, so that this and the telephone service shall be mutually


DUPLEX TELEPHONE TRANSMITTER.


DUPLEX TELEPHONE RECEIVER.

independent. Such arrangements are technically possible, but their future as a commercially successful means of earning revenue are very doubtful. In a word, it is easy enough to effect telephonic communication, but very difficult to establish a commercial telephone service with good economic prospects.

Short Wave Lengths.

Experiments have been carried out on the now fashionable short waves below 100 metres and surprising distances have occasionally been covered; but the commercial development of such methods demands sufficient traffic to support special stations, and, furthermore, there is the question of the advisability of using such wave lengths, which appear to hold the key to world-wide communication, for the service of ships which are, in fact, already quite well provided for. The volume of traffic between ships, and between ships and shore, is very unevenly distributed. About a dozen vessels carry a very heavy traffic, about 200 more carry a slight traffic, and the preponderating remainder (about 6,000) do not do much telegraph work. Any refinements in communication are only likely to benefit the big ships, and, heavy as their traffic is, it is doubtful if it is enough to support any additional stations on land.

There remains an outlet for a comparatively short distance telephone service for the convenience of ships about to dock, but the economic difficulty of finding enough of such traffic to support a special land station again bars the way to advance. It might be worth the expense to so equip ships, but the trouble is to cover the prime cost, upkeep, and wages of a station on land for them to communicate with.

Wireless Concerts in Ships.

A great deal has also been done towards the provision of satisfactory instruments for the reception of broadcast concerts, etc., in ships at sea. The broadcast transmitters are of ample strength, and there is no more difficulty in receiving concerts in a ship than on land, except for the matter of interference. To avoid this requires the use of complicated circuits, and the construction of the instrument has to be such that it will stand the onerous conditions of damp and vibration commonly experienced at sea. The interference caused by the transmission from other ships in the neighbourhood is by no means all the trouble, as a very great deal of interference is often caused by electric motors, etc., in the vessel itself. As a result, a high-class broadcast receiver, suitable for use in ships, is an expensive article, not likely to be required except in yachts and passenger-carrying vessels. In the former, the vessel can easily arrange not to transmit when it is desired to receive broadcast programmes; but in the latter it becomes very desirable that the receiver should not be affected by the ship's own transmitter. A further series of refinements, all meaning added expense, is then called for. Broadcast reception in passenger ships also offers problems as to the best

way to reproduce the programmes. Some people will want to hear them and others will not, some passengers will want loud speakers operating and others will want them switched off, and the best results seem to be obtained by fitting a large number of head telephones, so that anyone who wants to do so can pick them up, loud speakers being only used on special occasions.

Perhaps it is not strictly a wireless matter, but progress has also been made in the repetition of music played by a ship's orchestra in distant parts of the vessel. In many ways the problem very much resembles that of the reception and reproduction of broadcast programmes. If a faithful reproduction of large volume is required, elaborate apparatus has to be employed, and it becomes difficult to guard against ship noises caused by electric motors, etc., the most difficult to exclude being the ship's own wireless transmitter. With suitable apparatus a highly satisfactory service can be offered, and there is no difficulty in substituting a gramophone for the orchestra if required. Gramophone concerts reproduced in this way are more free from distortion and from the hiss of the needle than is usually the case with gramophone music. The arrangements are also perfectly suitable for the transmission of speech, and if so wired up they could be used for the delivery of orders in distant parts of the ship.

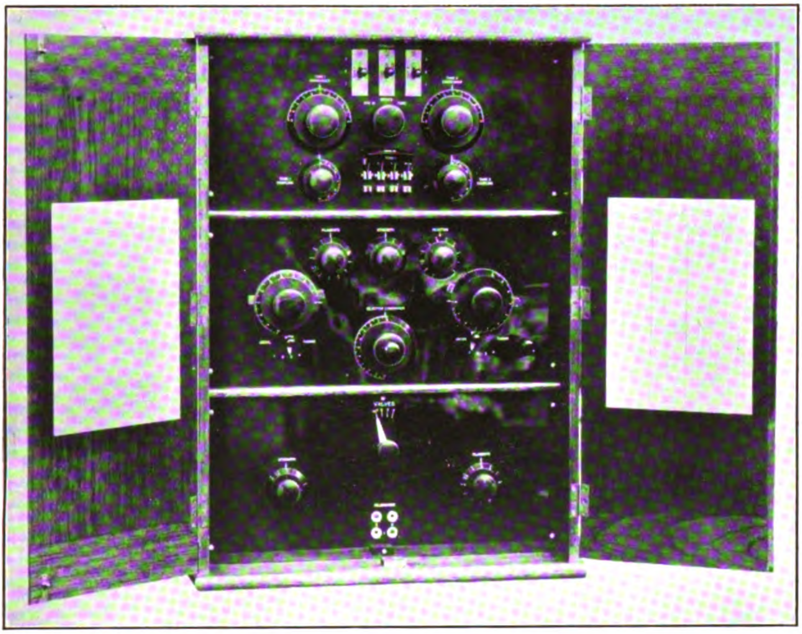
Lifeboat Wireless Equipment.

During the year 1925, the Board of Trade has enforced regulations requiring that a certain proportion of ships' lifeboats shall be equipped with wireless transmitting and receiving apparatus. A high standard has been laid down and the apparatus used is very powerful for its size and weight. The regulations demand an amount of power sufficient to give reasonable certainty of communication to a ship fitted with a crystal receiver at a distance of 50 miles, the usual ship wave of 600 metres being employed. Apparatus turned out with a sufficient reserve of power to make certain of meeting these requirements will occasionally cover remarkable distances, and cases have been reported of boats put into the water for exercise getting into touch with coast stations and ships at distances of nearly 300 miles. Of course, valve receivers were in use on these occasions. It is possible to carry out satisfactory tests with boats in their chocks; the electrical conditions are very different, but the results obtained form a fair guide to what the boats can do in the water

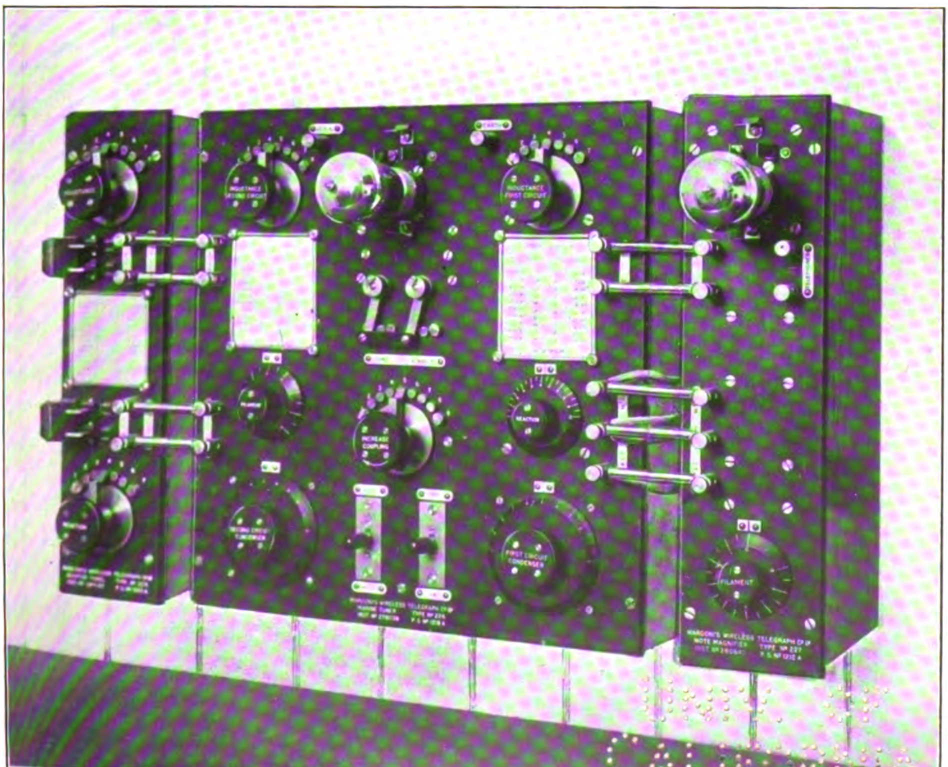
Some ships' lifeboats are fitted with directional receivers so that in time of disaster it will be possible for them to indicate to any ship coming to their assistance the direction in which they should steer. This additional refinement adds considerably to the utility of the set, but it is not a compulsory fitting, and is not commonly installed.

Alarm Devices.

During the year extensive trials have been carried out under Government supervision with "Alarm Devices," the object of which is to enable the attention of persons on board ship to be drawn to the



MARCONI V4 BROADCAST RECEIVER SUITABLE FOR SHIPS.



SHIP'S MODERN RECEIVER.

wireless apparatus during the hours when no wireless watch is being kept. In order that such a device may be reasonably certain in operation and free from false calls a special form of signal has to be introduced, which will be naturally easy to select by mechanical means from other signalling which may be going on at the same time. For this purpose a series of dashes, each of four seconds' duration, separated by intervals of one second, has been found to be very effective, and it is quite easy to send by hand. It is proposed to prohibit the use of this form of signal except in case of actual distress; that is to say, it will be used as the forerunner of the well-established "SOS" call, and for no other purpose. It will have the effect of calling telegraphists to their instruments, and as soon as they have taken up their duties signals can be exchanged in the ordinary manner.

The detailed result of the trials has been issued in the form of a White Paper, but at the time of writing no regulations on the subject have appeared. Briefly, about 90 per cent. of these trials show that successful calls can be expected under conditions in which it would be possible for a skilled telegraphist to realize that the call was being transmitted with a practical immunity from false calls.

Wireless Direction Finders and Beacons.

During the last twelve months steady progress has been made in the number of ships fitted with wireless direction finders, and ships so fitted are making more and more use of the instruments, as familiarity with the possibilities of the apparatus promotes confidence in the results obtained.

The matter is further improved by the slow but steady growth of stations operating specially for the convenience of navigators, which are called Beacon Stations. A long and elaborate series of tests in this country seems to have established the suitability of small power transmitters using interrupted continuous wave, and actually sending for nominally one minute in each five minutes on a wave length of 1,000 metres. A beacon station, such as the above, capable of being used with good results at distances up to 50 miles, causes little or no interference with other wireless services. One such experimental station has been established on Round Island, Scillies, and is giving every satisfaction. Bearings from it are quite reliable up to 50 miles from all positions where no high land intervenes between the ship and the transmitting station.

John A. Slee.

CHAPTER XI.

Empire Trade and Shipping.

The interesting frieze and pictures in the Overseas Settlement Gallery at the British Empire Exhibition trace the growth of the British Empire from the Middle Ages until the present date, and bring out clearly the intimate connection between the growth of the Empire and the development of overseas shipping. The existence of a far-flung Empire covering over 13,000,000 square miles and containing a population of 450,000,000 would be impossible if it were not for the effective connecting link maintained by the ships of the Empire, which alone makes the exchange of goods and passengers possible.

For some countries a Mercantile Marine may be regarded as a luxury born of sentiment. For the British Empire, and especially for the United Kingdom, it is a vital instrument born of necessity. In normal times the United Kingdom requires to find markets abroad for nearly 40 per cent. of its entire industrial product in order to pay for the necessary food supplies and raw materials. In 1924, the United Kingdom imported food to the value of £573,000,000 and raw materials to the value of £400,500,000. No other nation in the world is quite in the same position. We are not, and never shall be, agriculturally self-sufficient and at the same time a prosperous and powerful people. The loss of our export trade, therefore, would be to us an irreparable disaster. It is probably true that the British Empire could provide these vast quantities of food and raw materials, but it is not so clear that the British Empire could absorb the necessary exports that pay for them. The total population of the Empire is 450,000,000, of which the greatest part consists of the native population of British India. The total white population —63,000,000—is not much more than half that of the United States, but the foreign trade of the Empire accounts for about 40 per cent. of the foreign trade of the world.

A reference to Table I. will show that the trade of the United Kingdom with the Dominions forms an important, but not a predominant, part of its total trade. It may be stated broadly that 30 per cent. of the overseas trade of the United Kingdom is with Egypt, the British Dominions, and other British possessions, whilst for about 70 per cent. we are dependent upon foreign countries. These are some of the inescapable facts which must be borne in mind in considering our Empire trade and shipping.

TABLE I.—SOURCES OF IMPORTS OF THE UNITED KINGDOM, AUSTRALIA, NEW ZEALAND, EGYPT, UNION OF SOUTH AFRICA, CANADA, AND INDIA IN 1913 AND 1922.

Value in millions of £'s, and as a percentage of the total Imports of each *Country*.

FROM		1 UNITED KINGDOM.		2 AUSTRALIA.		3 NEW ZEALAND.		4 EGYPT.		5 UNION OF S. AFRICA.		6 CANADA.		7 INDIA.		8 TOTAL OF 2 TO 7.		9 TOTAL OF 1 TO 7.	
		Mill. £	%	Mill. £	%	Mill. £	%	Mill. £	%	Mill. £	%	Mill. £	%	Mill. £	%	Mill. £	%	Mill. £	%
1. United Kingdom.	1913	—	—	41·328	51·8	13·312	59·7	8·496	30·5	23·746	56·8	132·070	21·3	78·388	64·2	297·340	32·5	297·340	17·7
	1922	—	—	53·002	51·4	19·416	55·5	14·732	34·0	29·023	56·4	141·288	17·6	93·708	60·3	351·169	29·5	351·169	16·0
2. Australia.	1913*	38·065	5·0	—	—	2·915	13·1	0·368	1·3	2·218	5·3	0·713	0·1	0·611	0·5	6·825	0·7	44·890	2·7
	1922*	64·794	6·5	—	—	4·213	12·0	0·872	2·0	1·414	2·8	1·458	0·2	3·246	2·1	11·203	0·9	75·997	3·5
3. New Zealand.	1913	20·338	2·6	2·220	2·8	—	—	0·007	—	—	0·1	3·100	0·5	—	—	5·327	0·6	25·665	1·5
	1922	48·510	4·8	1·703	1·7	—	—	0·007	—	—	—	1·600	0·2	—	—	3·310	0·3	51·820	2·4
4. Egypt.	1913	21·395	2·8	0·017	—	—	—	—	—	—	—	—	—	0·209	0·2	0·226	—	21·621	1·3
	1922	31·104	3·1	0·022	—	—	—	—	—	—	—	—	—	0·439	0·3	0·461	0·4	31·565	1·4
5. Union of S. Africa.	1913	12·301	1·6	0·271	0·3	0·008	—	—	—	—	—	0·523	0·1	0·120	0·1	0·922	0·1	13·223	0·8
	1922	16·039	1·6	0·357	0·4	0·152	0·4	—	—	—	—	0·410	0·1	0·470	0·3	1·389	0·1	17·428	0·8
6. Canada (Year beginning 1st April).	1913†	30·448	4·0	0·965	1·2	0·453	2·0	—	—	0·861	2·0	—	—	—	—	2·279	0·2	37·227	2·2
	1922†	54·874	5·5	3·146	3·0	1·545	4·4	0·028	0·1	1·273	2·5	—	—	0·310	0·2	6·302	0·5	61·176	2·8
7. India.	1913	48·420	6·3	3·083	3·9	0·421	1·9	1·336	4·8	1·167	2·8	7·219	1·2	—	—	13·226	1·4	61·646	3·7
	1922	47·719	4·8	3·747	3·6	0·438	1·3	1·392	3·2	1·920	3·7	12·383	1·5	—	—	19·880	1·7	67·599	3·1
8. Total from U.K. and Dominions stated above.	1913	170·967	22·3	47·884	60·0	17·109	76·7	10·207	36·6	27·992	67·0	143·625	23·2	79·328	65·0	326·145	35·7	497·112	29·6
	1922	263·040	26·3	61·977	60·1	25·764	73·6	17·031	39·3	33·630	65·4	157·139	19·6	98·173	63·2	393·714	33·1	656·754	29·9
9. From other Countries.	1913	597·768	77·7	31·866	40·0	5·179	23·3	17·658	63·4	13·837	33·0	475·569	76·8	42·837	35·0	586·946	64·3	1184·714	70·4
	1922	740·059	73·7	41·089	39·9	9·249	26·4	26·303	60·7	17·784	34·6	645·326	80·4	57·267	36·8	797·018	66·9	1537·077	70·1
10. Grand Total.	1913	768·735	100·0	79·750	100·0	22·288	100·0	27·865	100·0	41·829	100·0	619·194	100·0	122·165	100·0	913·091	100·0	1681·826	100·0
	1922	1003·099	100·0	103·066	100·0	35·013	100·0	43·334	100·0	51·414	100·0	802·465	100·0	155·440	100·0	1190·732	100·0	2193·831	100·0

* Calendar Year, 1913, and Financial Year, July, 1921, to June, 1922.
† Financial Years, April, 1912, to March, 1913, and April, 1922, to March, 1923.

Inter-Imperial Trade.

In what follows an attempt has been made to analyse the trade of the countries which form the Empire with one another, particularly with the Mother Country and with the rest of the world, and to examine the part played by British shipping in fostering the trade and communications of the Empire.

Table I. shows the trade of the United Kingdom, the great Dominions, and Egypt with one another and with foreign countries. The table is confined to imports and shows for the years 1913 and 1922—latest year for which complete information is available for all the countries considered—the value in millions of pounds and the percentage proportion of the imports of each of the countries mentioned, from each of the other countries and from the remaining countries of the world. It brings out the striking fact that the grand total of the imports of the United Kingdom and the Dominions was, in 1922, nearly £2,200,000,000. This total includes all imports, *i.e.* both those intended for ultimate consumption by the importing country and those intended for re-export.

In the Survey of Overseas Markets recently published by The Committee on Industry and Trade, a table—confined to special imports of merchandise and therefore excluding re-exports—is given, comparing the world trade in 1913 and 1923. This table shows that in 1923, the world total (157 countries) of imports amounted to £5,700,000,000, of which the United Kingdom contributed £958·4 millions and other British countries £788·4 millions, a total of £1,746·8 millions, or 30·66 per cent. It is interesting to note that the United States, with a population of about 100,000,000, accounted for only 14·54 per cent. of the world's imports.

Empire Share of British Trade.

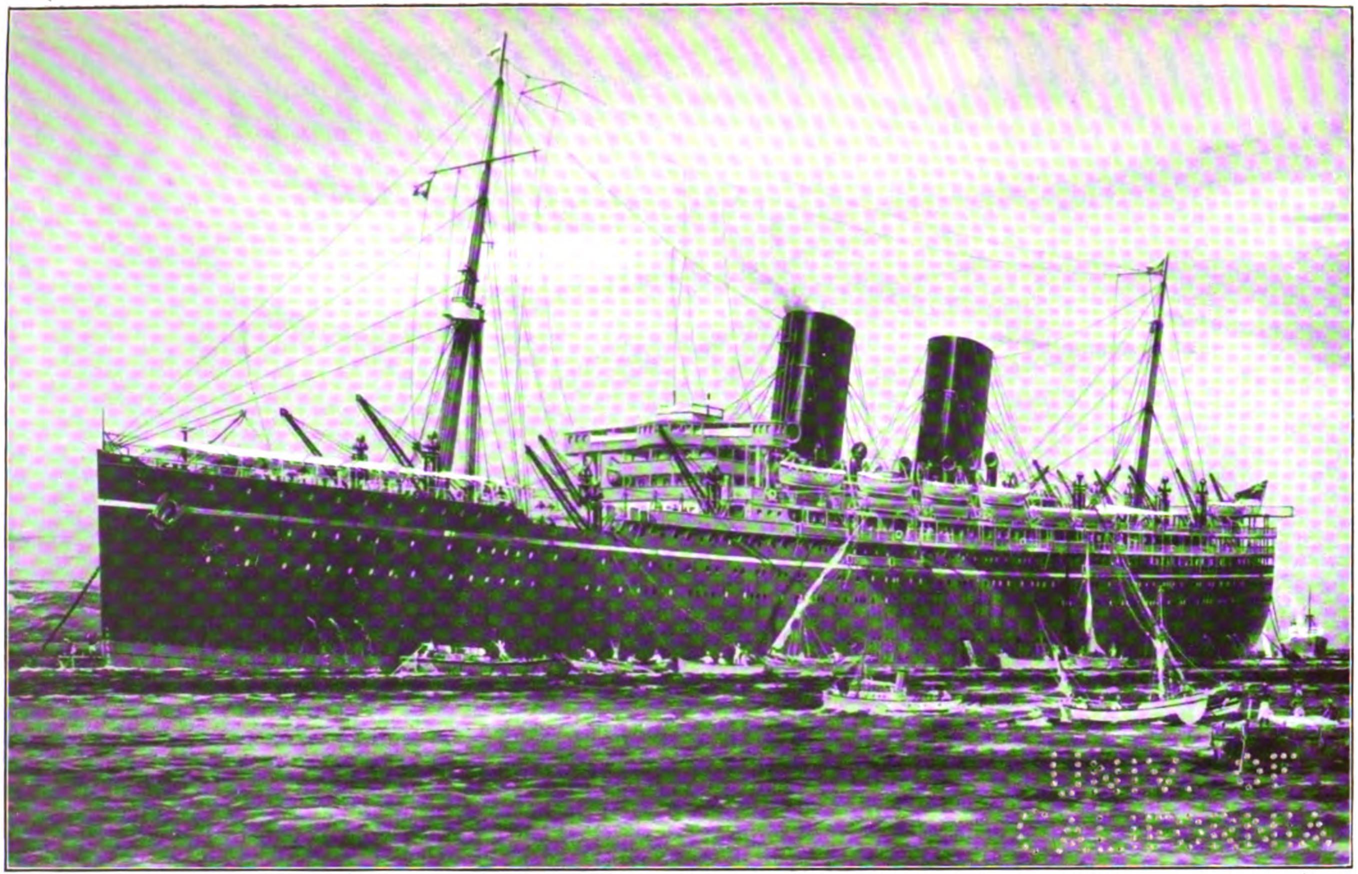
It is worth while examining Table I. in greater detail. In 1913 imports from Egypt and the British Dominions enumerated in the table formed 22·3 per cent. of the total imports, and imports from other British possessions not shown in the table amounted to 5·4 per cent., so that the United Kingdom was dependent to the extent of 72·3 per cent. of its imports on foreign countries. The corresponding figures for 1922 were 26·3 per cent. and 5·5 per cent. respectively, leaving the share of foreign countries 68·3 per cent.

If we consider only imports intended for home consumption the following figures emerge :

Table II.—United Kingdom Nett Imports Retained for Home Consumption.

	1913.	1922.	1923.
	%	%	%
(*a*) From foreign countries	79·4	74·2	75·6
(*b*) From British possessions . . .	20·6	25·8	24·4

The share taken by British Empire overseas of the exports of British produce and manufactures is rather larger than its share in supplying imports retained for consumption in the United Kingdom. Here the figures for 1924 are also available :



(From a drawing by G. Spurling.)

S.S. RANCHI FOR THE PENINSULAR AND ORIENTAL STEAM NAVIGATION COMPANY.

(Constructed by Hawthorn, Leslie & Co., Ltd.)

TABLE III.—UNITED KINGDOM EXPORT OF BRITISH PRODUCE AND MANUFACTURES.

	1913.	1922.	1923.	1924.
	%	%	%	%
(a) To foreign countries . . .	62·7	62·4	62·8	61·5
(b) To British possessions . . .	37·3	37·6	37·2	38·5

The chief facts brought out by the tables and by the figures quoted from the Survey of Overseas Markets are:

1. That the trade of the Empire is 31 per cent. of the trade of the world.
2. That the trade of the countries forming the Empire with one another is only 31 per cent. of their trade with the world as a whole; and
3. That the trade of the British Commonwealth of nations with one another, therefore, forms only 9 per cent. of the trade of the world.

Very similar facts would be brought out by a corresponding table dealing with exports.

BRITISH AND FOREIGN SHIPPING.

We may now turn to consider the extent by which this overseas trade is carried out by British and Foreign shipping respectively. The following table shows the seagoing steam and motor ships by which the ocean trades of the world were carried in 1914 and in 1924:—

TABLE IV.—STEAM AND MOTOR TONNAGE.

Ocean-going vessels of 1600 gross tons and upwards.

	June 30, 1914.		June 30, 1924.	
	Number.	Gross tons (thousands).	Number.	Gross tons (thousands).
Gt. Britain and Ireland	4,062	18,277	3,251	16,913
British Dominions	372	1,187	607	2,094
British Empire	4,434	19,464	3,858	19,007
United States (other than lake tonnage)	382	1,695	2,542	11,945
Austria-Hungary	242	944	(included in other countries)	
Belgium	119	733	125	489
Netherlands	318	1,311	481	2,283
France	404	1,672	633	2,881
Germany	982	4,702	492	2,168
Greece	260	809	176	634
Italy	360	1,386	529	2,494
Japan	421	1,500	759	3,193
Norway	398	1,163	498	1,727
Russia	187	607	(included in other countries)	
Spain	242	720	286	952
Sweden	210	594	227	715
Denmark	177	456	220	696
Other countries	232	678	447	1,716
	9,368	38,434	11,273	50,899

The United Kingdom owned 47½ per cent. of the world's ocean-going steam tonnage before the war, and only 33·2 per cent. in June, 1924. These figures are, however, somewhat misleading, as the world's total of ocean-going tonnage now contains over 4,000,000 tons of tonnage, which is probably permanently out of commission. If this is omitted, the United Kingdom's proportion becomes 36·1 per cent., and the British Empire seagoing tonnage becomes 50·6 per cent. in 1914 and 40·50 per cent. of the effective seagoing tonnage in 1924.

In whatever way we look at it, British ocean-going shipping, which is 40 per cent. of the world's total, is not only more than adequate to meet the requirements of the Greater Empire trade, which forms 9 per cent. of the world's total, but would also appear to be substantially in excess of the requirements of the trade of the Empire with the whole world. This conclusion must be modified to some extent in view of the enormous distances between the different parts of the Empire. One ship trading between Europe and the United States is, in view of the shorter distance, as effective as several ships carrying between the United Kingdom and Australia.

Shipping Services.

The distant parts of the Empire are particularly well served by regular liners, and for this maintenance of regular and certain communication with the Old World particular credit is due to British lines. An examination of Lloyd's loading list for July 13, 1925, shows that on that date 132 passenger and cargo liners were recorded as homeward or outward bound in the Australasian trade; of these vessels 112 belonged to British lines, including 8 to the Australian Commonwealth Line, and 20 belonged to foreign lines. In the same issue of Lloyd's loading list 152 passenger and cargo liners are recorded on homeward or outward voyages from or to British India. Of these 97 belonging to 17 different lines were British, and 55 belonging to 30 different lines were foreign.

The explanation of this surplus of British-owned ships over and above the tonnage required to carry the Empire's trade is, of course, to be found in the fact that the British people have been professional sea carriers for generations, and that the "export" of maritime transport in exchange for imported food and raw materials is as vital a part of the national economy as the export of manufactured goods. It is, therefore, regrettable to note that there has been a tendency in recent years for Empire trade to be carried in British vessels to a smaller extent than before the war, and at the same time for the Dominions to import less in volume from the United Kingdom, while exporting more to it. A striking illustration of this is provided by the Canadian statistics. Canada's foreign trade is by far the greatest of any of the Dominions. In 1914, Canada's overseas imports amounted in weight to about 4·8 million tons and her exports to 7·3 million tons. In 1923, the weight of the imports was practically the same, 4·8 million tons, whilst the weight of the exports, 12·4 million tons, was nearly

70 per cent. higher than in 1913. The proportion of Canada's oversea's imports carried in ships belonging to the United Kingdom fell from 48·5 per cent. in 1913 to 35·5 per cent. in 1923.

The decline is even more striking when we consider the proportion of Canada's exports carried in ships belonging to the United Kingdom. In 1913–14, over 63 per cent. of Canada's exports by volume were carried in British ships. In 1923 it fell to 39 per cent. In fact, whilst the volume of Canada's exports increased by 5,000,000 tons, the volume carried in British ships only increased by 200,000 tons.

The Balance of Trade.

We thus have to face a series of facts all tending in the same direction—that of making a well-balanced exchange of goods and services between the United Kingdom and the Dominions more difficult. The United Kingdom maintains a population of over 47,000,000 on a small island by exchanging her manufactured goods, her coal, and her shipping and financial services for food and raw materials.

The Dominions are anxious to sell to the United Kingdom the food and raw materials they produce. They are, however, developing at the same time to an increasing extent their own manufactures, and their tariffs tend to prevent the entry of the very goods by which this food and raw materials must be paid for. Further, by establishment and maintenance of Government-owned fleets, they are jeopardising that part of the payment which is made in the form of shipping services.

The following is a striking illustration of the way in which a tariff operates. A four-seater car, costing £1,000 in London, is carried to Australia for £27 9*s*. 6*d*. or 2·7 per cent. of its value. The duty on that car entering Australia under special preferential treatment is £350.

It is not always realised that, from the point of view of the producer and the consumer, countries separated by thousands of miles of sea are, economically speaking, closer together than if separated by hundreds of miles of land. In Britain, last winter, the public were much exercised about the increase in the cost of the 4 lb. loaf, following an increase in the cost of wheat. Canadian wheat is brought to London in the winter months, 2,700 miles to the seaboard and then 2,920 miles by steamer to London. The total cost of the carriage of a ton of wheat is in this case 72*s*., of which the steamer gets 14*s*. In other words, the cost of transport in winter is equal to 1½*d*. on a 4 lb. loaf, and of this the steamer, which carries for more than half of the whole distance, gets ¼*d*., while 1¼*d*. is paid for the land portion of the transport.

Passenger Traffic.

The extent to which shipping forms a link with the Empire in the carriage of passengers may be partly measured by the following figures. In 1923, 88,290 migrants of British nationality were

carried to British North America, 39,967 to Australia, 9,392 to New Zealand, 7,629 to the Union of South Africa, and 11,784 to other parts of the Empire, a total of 157,062. Of course, emigration from the United Kingdom to the Colonies is much smaller than it was pre-war. In 1913, 190,854 migrants of British nationality entered British North America alone, the total to all parts of the Empire being 385,046. Migration to the overseas parts of the Empire has an important bearing upon the demand for British goods.

It would be well if the Dominions would realise that they can only sell their products to the United Kingdom if they will receive merchandise and services from the United Kingdom in payment, and that impediments placed in the way of the smooth performance of its functions by British shipping, such as competition by State-owned fleets run at a loss, the prohibition of participation in the coasting trade, and, in many cases, the taxation of shipping calling at Dominion ports, are bound in the long run to react disastrously on the prosperity of the whole Empire.

Overseas Peoples as British Buyers.

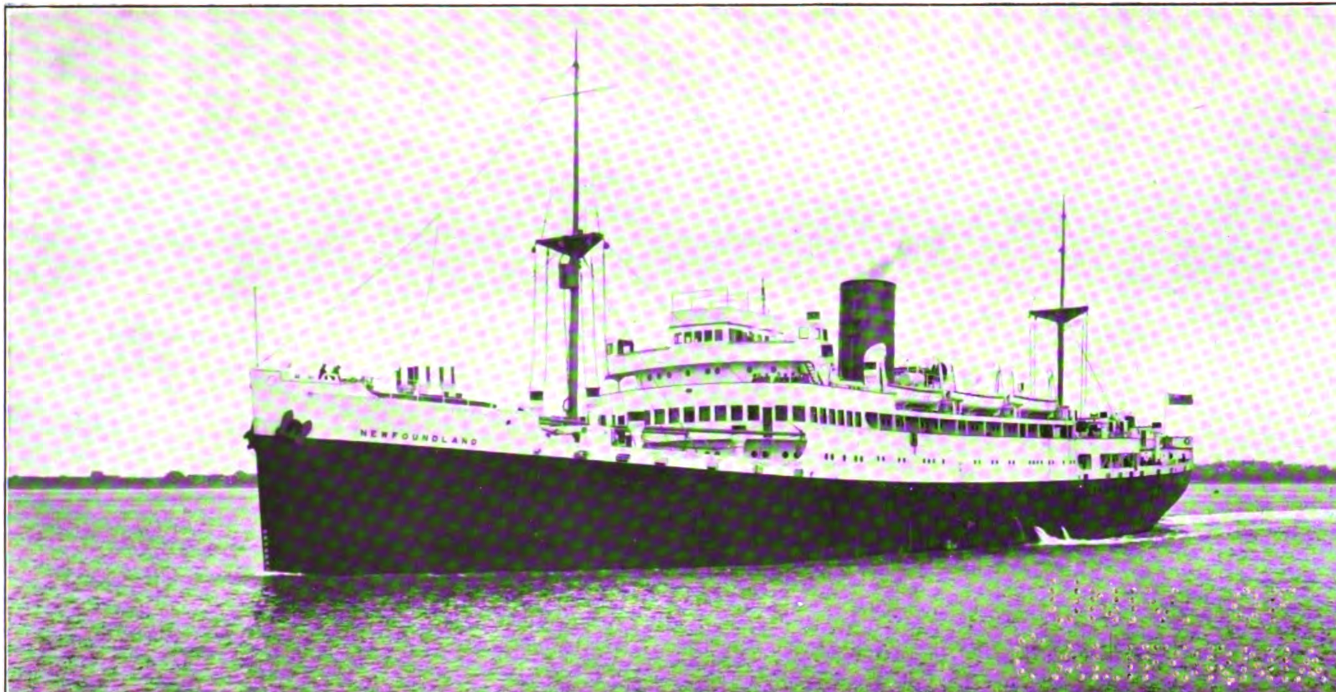
There is happily a growing sentiment in favour of, and possibly also an increasing economic necessity for, the development of inter-Empire trade. The Dominions have given preference to British goods for many years—Canada was the pioneer twenty-eight years ago, New Zealand and South Africa followed twenty-two years ago, and Australia nineteen years ago. This policy has been of mutual benefit, and has stimulated Empire trade. That trade is important and is growing as the following table clearly shows :—

Table V.—The per Capita Purchases of British Produce and Manufactures by Certain Countries.

Country.	Year 1913.			Year 1924.		
	£	s.	d.	£	s.	d.
New Zealand	9	12	0	15	3	3
Australia	6	18	6	10	9	0
South Africa	3	14	0	4	7	0
Canada	3	1	0	3	4	0
France		14	6	1	1	3
Germany		12	6		14	3
Russia		2	6			9
United States		6	0		10	0
Argentine	3	0	6	3	2	0

This table shows the advantages of migration to the Empire as compared with migration to foreign countries. If, for example, a family of five had settled in New Zealand, they would have purchased in 1924 over £75 worth of British goods ; if the same family had settled in Australia they would have purchased £52 worth of British goods, while if they had settled in the United States they would only have purchased British goods to the value of £2 10*s*.

At the same time it is well not to lose sight of the transport



S.S. NEWFOUNDLAND FOR THE LIVERPOOL-NEWFOUNDLAND SERVICE OF FURNESS, WITHY & CO., LTD.

(Constructed by Vickers, Ltd., Barrow-in-Furness.)

handicaps that exist. If one compared Australia and New Zealand with the Argentine, all supplying this country with beef, the fact that Australia and New Zealand are twice as far away as the Argentine is an obvious handicap from the point of distance alone; but there is this further disability in regard to Australia and New Zealand that, owing to the greater distance, they are bound to send frozen beef, whilst from the Argentine they are able to ship chilled beef, which is a superior article. We have the same position in regard to bacon as between Canada and Denmark. Denmark being near can supply mild cured bacon, whilst, until recently, a harsher product was required from Canada in order to stand the greater length of journey.

Enterprise of the British Shipowner.

The British shipowner—without any preferential treatment—has done his part to overcome these handicaps. The class of tonnage supplying Australia and New Zealand is quite equal, if not superior, to that operating from the Argentine. Whilst Canada has the advantage of fast refrigerating steamers such as do not operate from Denmark, the relatively lower freights for the longer voyage should, and do, in fact, largely counteract the geographical disadvantages.

Opinion in the Dominions must be correctly informed of the nature and functions of British shipping. With fuller knowledge, the criticisms that have from time to time been made by certain Dominions that freights make it difficult for them to sell their produce abroad would not have been made.

William J. Noble.

CHAPTER XII.

The Future of American Shipping.

A contributing element in the apparently strong desire of the American people to possess a merchant marine is the fact that the United States once occupied a leading position as a maritime nation. This position was maintained from the inception of the Government until 1861, in other words, until the beginning of the Civil War. During that period of seventy years the United States, in point of tonnage owned, was second only to Great Britain, and during practically a third of that period its tonnage increased faster than that of Britain.

It is also of some significance in this connection that in 1861 over 65 per cent. of the foreign carrying trade of the United States was conducted in vessels of American registry, while by 1915, though the protected coastwise tonnage and the tonnage on the Great Lakes had increased year by year by leaps and bounds, of the total of 8,389,429 gross tons, constituting the merchant marine of the United States, 4,495,051 tons were employed coastwise, and only 14·3 per cent. of imports and exports were carried in American vessels. The previous year it was only 9·7 per cent., and in 1911 it fell off to 8·7 per cent.

It becomes necessary to give heed to these figures if one is to understand the merchant marine situation in the United States at the present time, since they influence importantly the state of mind of the American people in planning for the future.

It required a world war to awaken the American consciousness to a realization of the low estate to which the American merchant marine, or that part of it employed in foreign trade, had fallen. When that conflict, even at its very inception, absorbed tonnage in unexpected, and of course unparalleled, volume, and freight rates moved to unexampled heights, the American shipper (and in supplying war demands he became almost universal) realized fully for the first time his dependence upon alien shipping. Indeed, he was distinctly shocked to learn that there were not more than a beggarly half-dozen ships regularly running across the Atlantic between Europe and the United States under the American flag. Finally came the entrance of the United States into the war and the widely insistent demand for ships, and more ships, for the transportation of troops and supplies and the commodities necessary to the support of the industries contributing to the satisfaction of war's requirements.

The War Time Effort.

The scenes that ensued along the coasts of the United States have never been paralleled in marine history. They are worthy of an epic. In a few short months there arose out of almost nothing shipyards

of a capacity exceeding any previously known anywhere. Thousands of men, 381,000 to be exact, were instructed and put to work building ships, and in an incredibly short time hundreds of hulls were completed or approaching completion in 223 shipyards having 1,099 ways, 40 per cent. of which were employed in building steel ships. The famous yard at Hog Island, on the Delaware River below Philadelphia, which was built mainly during one of the coldest winters ever known, and at a cost of $66,000,000, had 50 ways, employed 41,000 men, and at the peak of its production was sending off the ways a 7,500 dead-weight ton ship every 72 hours. And then came the Armistice!

Meantime the Government had spent over $3,000,000,000 for its essay in shipbuilding, a sum sufficient to have purchased before the war all the merchant ships and shipyards in the world, with a comfortable margin to spare. Had the country possessed at the beginning of hostilities a merchant marine commensurate with its standing as an industrial and trading, not to say maritime, nation, more than half of this tremendous expenditure would have been avoided.

That ships, harbours, easy access to the sea, vast quantities of commodities, and great wealth cannot alone create a merchant marine is a fact that the American people are slowly learning. It is men, and still men—men of experience, working against a background of generations of acquired knowledge of all the sea trades in the world, in conjunction with long-established agencies of banking, underwriting, forwarding, and the rest—that are the foundations of success in operating ships. Time was when the United States could supply all this, but that time has long since passed. Years of lost contact with the sea and international trade have resulted as might have been expected. There is not in the United States to-day, nor will there be for years to come, a large body of experienced men capable of successfully conducting the shipping business. There are a few such, but only a few.

Public Indifference to Shipping.

And for the same reason that there are not at least a considerable number of experienced shipping men, there is also an absence of an informed public opinion upon marine subjects. The American people have forgotten how to be shipminded, consequently they are largely indifferent to what befalls their national shipping. This state of mind does not extend to the country's navy. For fifty years the slogan, "the flag and an appropriation," could be depended upon for an emotional, not to say patriotic, response that resulted in a constantly expanding navy. But the indifference to the merchant marine has become proverbial, and this lack of interest is very naturally reflected in Congress.

Writers in our marine journals and in newspapers that specialize in marine news, have contrasted the large representation of the British shipping interests in Parliament with the entire absence of such representation in Congress. They have pointed out that there is not now, nor has there been at any time in the last half-century,

a single member of Congress possessed in the slightest degree of first-hand knowledge relating to ships or the sea. Nor can there be found among the members more than two or three of above the average intelligence who have made any special study of the subject from an economic, as distinct from a political, or sectional, standpoint. Hence the regrettable circumstance that shipping legislation has been too often sacrificed to political or party expediency and hence, in its least objectionable aspect, the errors of commission and omission so characteristic of our shipping legislation.

The industrial prosperity of the United States has been so consistently progressive, and its capacity for consuming its own products has been so large, that the people of the country have heretofore not been confronted by the stringent economic conditions under which the people of Europe have lived for centuries past. It is therefore difficult to impress upon the mind of the American public that shipping is an international industry, governed and controlled by economic laws as immutable as the ocean, and that these laws can only be disregarded at the cost, in the long run, of severe penalties. Even those deep-thinking Americans who appreciate that in economic conditions lies the fundamental determining factor that governs whether a country's merchant marine shall be large or small—whether or not that country is driven by necessity into trading overseas, and whether or not capital is attracted to overseas adventure—are faced by the concrete fact that to-day the American Merchant Marine is in existence and striving for its place in the maritime trade of the world.

A Notable Achievement.

In giving consideration to the solution of America's shipping problems, the one outstanding fact is that during the years 1917 to 1919, ships were manufactured in American shipyards at a rate that astounded the world, and even astounded the American people themselves. The sudden and unexpected termination of the war, with the appallingly rapid drop in the demands for ship tonnage that followed soon after, left those of the American people financially interested in the merchant marine in a state of mind that can be mildly described as "confused," and those not interested calmly indifferent. But the fact remains that they still have those ships, and that some solution as to their future must be worked out.

These are facts that are not to be disregarded in contemplating the future of the American Merchant Marine, because that future largely depends upon whether or not public opinion upon the subject becomes intelligent; and whether or not, if it acquires intelligence, that intelligence can be impressed upon Congress. There are those who believe that this will eventually be accomplished, although eventually may in this instance be synonymous with remotely.

Remedies for the Present Situation.

On the presumption that it is desirable to have a large and permanent American Merchant Marine, despite the very plausible arguments advanced in opposition, it is necessary to consider how

it is proposed to achieve this. Disregarding the numerous and spectacular theories submitted with complete assurance for public consideration by well-meaning but uninformed persons searching for a nostrum which will by magic produce a state of health, a review of some of the worth-while remedies advanced by reputable newspapers, prominent men, important Chambers of Commerce, Boards of Trade and Maritime Associations, as well as practical steamship owners, besides the multitude of bills constantly being introduced into Congress, amply demonstrates the bewildering confusion of ideas upon the subject, and the difficulties encountered in any attempt to arrive at a diagnosis and obtain an infallible prescription for a cure. Among these proposed remedies are:

(A) Such a revision of the navigation laws as will put American ships on a parity with those of competitive nations in this respect.
(B) Preferential duties on goods imported in American bottoms.
(C) Preferential rail rates between the interior and the seaboard on goods carried in American ships.
(D) Increased tonnage dues on foreign ships operating between the United States and other countries than their own.
(E) Payment of subsidies to American ships.
(F) Government ownership and operation of ships.

(A) The navigation laws are contained in the national statutes pertaining to shipping and the rules of the Supervising Inspectors of Steamboats made pursuant thereto, which have the force of law when approved by the Secretary of Commerce. These in many ways impose burdens upon American ships which are not obligatory upon their competitors. American steamship owners complain that they are constantly being menaced with governmental interference; that no sooner is one sweeping change precipitated, involving an expenditure of thousands of dollars per ship, than another order is promulgated or a statute enacted by Congress, which necessitates the replacement of equipment just installed by other and different equipment, which, in turn, may as soon be ordered to be thrown aside and some other substituted; that it is impossible to expect to be able to compete with the ships of other nations under such conditions; and that the dread of these heavy expenditures makes American shipowners timid in their ventures.

The Steamboat Inspection Service retorts that these requirements develop as the result of actual experience with accidents aboard ship, and that they are judged necessary for the safety of life at sea. The response to this is that Great Britain, Germany, France, Norway, and other nations are as much interested in the safety of life aboard their ships as Americans are aboard theirs, and that if such requirements are absolutely necessary they should be made a matter of international agreement so that all nations would be on a parity.

Influence of the Seamen's Act.

The exactions of the Steamboat Inspection Service as to the number of officers, and as to their grading, both in the deck and

engineering departments, on American vessels are also more stringent than the requirements enforced on foreign vessels. These legal impediments which handicap American shipping, though each may seem of minor importance, it is contended, form in the aggregate a formidable barrier to the United States capturing the proportion of the shipping of the world to which it may legitimately aspire.

The requirement of the Seamen's Act, that American crews must understand the language of the officers, militates against American shipowners, particularly in their competition with Japanese ships which perform a considerable part of the carrying trade to and from the United States, at least in the trans-Pacific routes. Though this disability equally applies to British, German, Scandinavian, and Japanese ships entering American ports, they have no difficulty in complying with it, since their crews and officers are all of the nationality of their ships. The British, of course, on many of their tramp steamers have Chinese and Lascar crews, but few of these trade to the United States. The requirements of that Act as to the number of able seamen and certificated life-boatmen which an American ship must carry, and which no other nation applies, naturally limits the number of qualified men, and thereby increases the wages of these members of the crew.

One of the most onerous burdens on American shipping is the requirement that a 50 per cent. tax must be paid on the cost of repairs made to American ships while abroad.

It is admitted, however, by steamship owners that even if all the navigation laws of the United States were immediately made as liberal as those of other countries, this alone would not suffice to counteract other and more depressing disabilities under which American ships labour in their competition in the international trades.

Policy of Ship Protection.

(B) An effort was made in the Tariff Act of 1913 to revive the old policy, in effect from 1789 to 1830, of ship protection by allowing a discount of 5 per cent. on all duties on merchandise imported in vessels under the American flag, but with the proviso that this should not affect the treaties between the United States and any foreign country. Inasmuch as the United States has entered into treaty arrangements with most of the maritime countries of the world agreeing *not* to levy discriminating duties, this clause of the Act has become inoperative. If operative, it would have meant a reduction in the customs revenues of about $10,000,000 annually. Even in the absence of these treaties, this policy, if enforced, would probably have led to such wholesale retaliation against American vessels on the part of the foreign countries discriminated against, as to cause the speedy repeal of the legislation.

A greater objection is that most of the commodities imported into the United States from South American countries, whose trade America seems to be most eager of all to capture, are on the free list ; and, of course, there can be no such discrimination in American exports for the reason that the United States Constitution prohibits

a tariff of any kind on these. It is even claimed by statisticians that despite the high protective tariff, about 45 per cent. in value and about 65 per cent. in bulk of all American imports are non-dutiable. If these figures are correct, it is difficult to understand the potentialities of this scheme. Discriminating duties, therefore, are practically out of the question, as they do not go to the root of the problem, and, besides, they would be enormously expensive by reason of the loss of the revenue which they would occasion.

Preferential Railway Rates.

(C) Section 28 of the Merchant Marine Act of 1920 provides that on traffic moved wholly within the United States the lower rail rates applicable to exports and imports, which are in most cases considerably below the rates on domestic traffic, shall apply only on traffic transported overseas in American flag ships, while the higher domestic rail rates shall apply on traffic moved in foreign flag vessels; but it is also stipulated in this section that the Interstate Commerce Commission shall not enforce this requirement until officially advised by the United States Shipping Board that there are a sufficient number of ships under the American flag in operation to fulfil the commercial needs of the country. In 1924 the United States Shipping Board did so advise the Interstate Commerce Commission, but so overwhelming were the protests on the part of exporters and importers of the country against this alleged sufficiency of American shipping that the Shipping Board withdrew their recommendation to the Interstate Commerce Commission, and so far have not attempted to reconsider this decision.

The principal argument against the enforcement of the section was that it would naturally lead to routings through Canadian ports and seriously injure the commerce of American ports. If the clause restricting the application to traffic moving wholly within the United States were eliminated, the enforcement of the section so amended would undoubtedly cripple American commerce to the extent that American shipping is not sufficiently abundant to meet the commercial needs of the country, and would be particularly injurious to the outer ports on the Atlantic Coast, in their competition with the ports of New York with its much greater frequency of American ship sailings.

(D) This provides for an increase in the tonnage dues equal to the difference between the cost of operation of American and foreign ships, to be imposed upon foreign flag ships operating between the United States and any country other than their own, on the theory that when so trading they are in reality merely using the foreign commerce of the United States as a convenience and at a profit to themselves. It is contended that this proposition would appeal to the people of the United States, for the reason that it would add to the revenues of the country rather than to its expenses, as would be the case with respect to a subsidy; that if retaliation by adopting the same measures were attempted by other countries this would affect the American ship only when trading between two foreign

ports and not when operating between the United States and foreign ports; and that, as it will no doubt require a considerable length of time before it is found necessary or desirable to operate between the ports of foreign countries, American ships would not be seriously affected.

The Position of the Manufacturers.

The effect, however, of the enforcement of this penalty on foreign flag vessels trading, say, between South America and the United States, which would obviously necessitate these vessels increasing their freight rates to a parity with the rates on American flag vessels trading between the same ports, would be to make the rates of freight on all vessels between the United States and South America higher than the rates of freight between British, German, and Scandinavian, etc., ports and South America. The consequence of this would be that the American manufacturer in competing for orders in South America would be handicapped in ocean rates just to this extent in competition with British, German, etc., manufacturers. Carried to its logical conclusion, if the American manufacturer, where the freight rate was controlling, did not procure the foreign order, not only would he have lost a sale, but also neither American ships nor foreign flag ships trading between the United States and South America would carry the cargo.

The relative geographical proximity of Europe and the United States to South America is not generally appreciated. Most natives of the United States have been trained from their school days to consider the Western Hemisphere as a part of the world distinct and separate from the Eastern Hemisphere. To so great an extent has this fallacy permeated their minds that it is not surprising to find, every now and then, articles contributed by special correspondents of highly reputable American newspapers to the effect that the producers of manufactured goods in the United States have exceptional opportunities to displace European manufacturers in the foreign commerce of the South American Republics owing to the closer proximity of the United States. This misconception arises largely from the fact that their geographical knowledge is almost exclusively derived from a study of sectional maps rather than from a globe, which latter alone exhibits the true contiguous relationship of the various parts of the earth. The following table of distances from Buenos Aires and Rio de Janeiro, which are the two chief ports on the East Coast of South America, to the United States, Canadian, and European ports is illuminating in this respect:

Buenos Aires to:	Miles.	Rio de Janeiro to:	Miles.
New York	5871	New York	4770
Baltimore	5945	Baltimore	4844
New Orleans	6281	New Orleans	5180
Halifax	5731	Halifax	4630
St. Johns, N.F.	5665	St. Johns, N.F.	4564
Liverpool	6233	Liverpool	5132
London	6308	London	5211
Southampton	6142	Southampton	5029
Genoa	6135	Genoa	5022
Hamburg	6619	Hamburg	5518
Norfolk	5824	Norfolk	4723

The ownership and operation of the tramp ship, which is the foreign flag vessel penalized under this proposition, requires a commercial machinery extremely complex. She has no schedule. If a bad harvest in the United States cuts off the grain export, the tramp which has done the work in the North Atlantic may seek freight at the mouth of the Danube or South Russia, or in the Indian Ocean or the East Indies. Wherever cargo is offering, there she may go; for rice to Rangoon, for jute to Calcutta, or for sugar to Java. Much of the work of these vessels is of a seasonal character, a certain region shipping its products at a particular time only; Californian wheat is ready at a different season from that of the Argentine Republic or India; the corn of the Mississippi Valley is ready later than the wheat from the same region; there is a different sugar season for Hawaii, Peru, Java, Germany; there is a cotton season and a nitrate season, the latter being decided by the demand for nitrate in the spring planting time of the Northern Hemisphere.

The Subsidy Problem.

(E) The United States to-day pays no direct subsidies to private steamship companies, but does indirectly subsidize some of them by liberal main allowances. Under the general statute for the sea-conveyance of United States mails, steamers flying the American flag are paid 80 cents a pound for letters and postcards and 8 cents a pound for other articles, as against 35 cents a pound for letters and postcards and 4½ cents a pound for other articles when carried by ships under foreign flags. Under the Ocean Mail Act of March 3, 1891, contracts were made for the carriage of mails on American steamers, the remuneration being on the basis of mileage and the speed of the steamers, regardless of the quantity of mail carried. The total payments for these contracts are but a little over $1,000,000, and but very slightly in excess of the sum that would have been allowable to the beneficiary companies at the 80 cent and 8 cent rates under the general statute if they had not been under contract arrangement and had conveyed the same quantity of mail matter. Certain burdensome conditions have to be fulfilled by the steamers in these mail contracts which it is claimed more than offset the slight excess amount paid for the service.

Great Britain does not pay any subsidies to her cargo carriers, which constitute the larger portion of her shipping. She does, however, pay about $1,050,000 to merchant seamen enrolled in her Naval Reserve, about one-third of a million dollars as annual retainers for seamen who drill seven days a year with the Navy, and about $100,000 a year to merchant seamen as Royal Naval Volunteers.* These appropriations, while intended primarily to provide a supply of seamen from which the Navy may draw to obtain crews during hostilities, are of much assistance to the merchant marine. Great Britain also pays Admiralty subventions to about twenty fast steamers, so built according to Government plans and specifications,

* The Navy Estimates, 1925–26, show the total cost of the R.N.R., including retainers, to be £136,500; Royal Fleet Reservists are not merchant seamen; and Royal Naval Volunteers are civilians.

that they can be readily converted into auxiliary naval cruisers. These amount to about half a million dollars annually. In addition to this, the Cunard Line receives an annual subvention of three-quarters of a million dollars, in return for which the British Admiralty acquires the right to purchase or lease any vessel owned by that company. These allowances * by the British Government are exclusive of payments on a liberal scale for the carriage of mails.

The British Taxpayer and Shipping.

While it is true that not a single British tramp ship receives financial assistance from the Government, yet these vessels undoubtedly share in the general policy of national encouragement of shipping, since they have been constructed in shipyards and their engines built in machine shops developed by the grants to the large steamship lines. Whether the payments made by Great Britain and other foreign countries to their shipowners and seamen can be termed subsidies has been a subject of much debate in the United States. It is doubtless true that the British contract mail system, in operation in some of its features for about eighty years, is theoretically political and military, but it has none the less helped to develop British shipping, shipbuilding, and commerce, as it was intended that it should do. Bounties, subsidies, or subventions are all terms used for payments made for some kind of value received, irrespective of the policy which may be involved—in one case the carriage of mails, in another the maintenance of national defence, in yet another the encouragement of trade. And it sometimes occurs that where a given sum is granted as a subsidy it is very difficult to analyse it into its component parts and say that so much of it is paid as a postal subsidy, so much for Admiralty purposes, or so much for the encouragement of trade. British policy has usually been to subsidize ships for postal or Admiralty purposes only, and to exclude all consideration of trade interests ; but even in the British case rapid postal communication has mainly, and in fact necessarily, followed the lines of great commercial traffic. A general result of these mail subsidies has been that the fast mail ships have developed a trade for the company which warranted the employment later on of intermediate passenger and cargo steamers.

There is, throughout the United States, a distinct sectional cleavage and sentiment in regard to a policy of subsidizing steamship lines, which have been developed by sectional character and traditions. The population of the United States resident in and near the Seaboard Cities on the Atlantic, the Gulf of Mexico, and the Pacific are more inclined to support a subsidy policy to institute and maintain shipping under the American flag than are the people in the interior of the country. The people in the Southern States, which until recently were so largely devoted to agriculture, have been historically opposed to all protective legislation, whether for shipping or manufacturing, though, on account of the rapidly increasing industrial development of that part of the country, they are not now so

* Navy Estimates, 1925–26, show the total £115 000, of which the Cunard subsidy is £90,000.

unanimous in their opposition to such a policy. The manufacturing section of the Middle West, which is now the greatest industrial area of the United States, and more greatly the beneficiary of the protective tariff system, is decidedly opposed to conceding similar assistance to the shipping industry.

American Industries and Ocean Transport.

Until very recently, when the manufacturing centre of gravity, so to speak, shifted to the Middle West, the New England States have been the predominant industrial section of the United States, despite the fact that not a ton of coal or a pound of iron (the basic factors in manufacturing) is indigenous within them. But only the six New England States which from the earliest settlement of the country have been more prominently identified with shipping than any other section, are largely in favour of subsidizing American shipping.

It is rather odd that the opponents of subsidies to merchant shipping in the West and South are almost unanimously in favour of the maintenance and extension, at the expense of the whole country, of its rural post delivery, though the Post Office Department reports that this service involves a loss of over $40,000,000 annually, which falls most heavily upon the large Eastern cities; and, with like inconsistency, the same people are demonstrably enthusiastic for the construction at national expense of mammoth reclamation projects for the benefit of the farmers of the interior of the country.

The most forcible objection raised to a system of subsidies to American shipping is that no ordinary subvention, reasonable in its scope, will of itself create a great merchant marine, and that it has been amply demonstrated that it has never done anything of the sort in the experience of any other country in the world. Furthermore, that in any serious study of this problem it should not be forgotten that less than one-tenth part of the ocean-going vessels to-day are the beneficiaries of subsidy support.

It is claimed that if subsidies are to be given at all, they should be applied to assist in the establishment of fast mail service, or to encourage the construction of merchant vessels on special lines which would make them easily convertible to naval purposes, but that these are purely political considerations which should be considered independently of the commercial factors of the problem; and that *as* political considerations, the country ought frankly to face the problem under the head of military measures.

Merchant Ships in War Time.

Opinion is divided as to the value of merchantmen so built that they can be used in time of war for military auxiliaries. According to some, such vessels make neither good merchant vessels in time of peace nor good auxiliaries in time of war. And it is generally admitted that, other factors being equal, they cannot compete with vessels specially designed for commercial use; that if the Government wishes to encourage the construction of such vessels the expense

must be considered the cost of militarism and not as a special support to shipping; that the fact of the matter is that no country can build up a permanent and prosperous merchant marine upon any other basis than commercial profits.

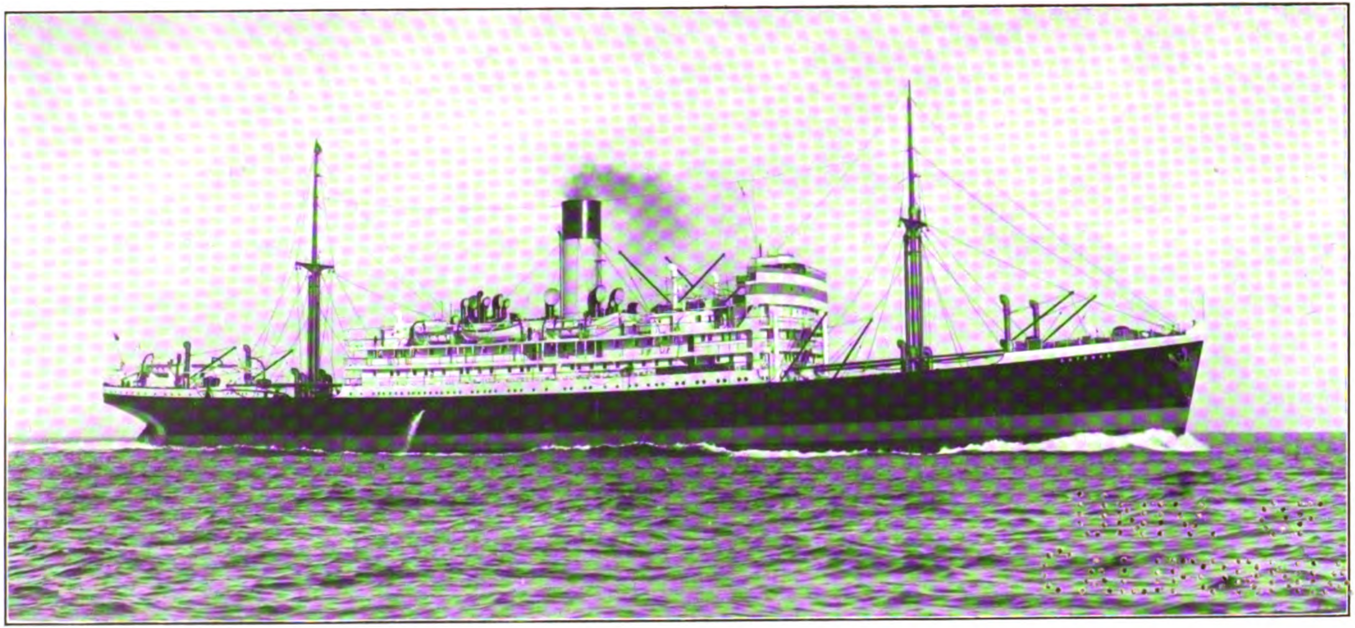
In favour of general navigation bounties, it is argued that since the primary purpose of the bounty is to offset the economic and other disadvantages to which the shipping aided is subject, as compared with foreign shipping with which competition must be carried on, the natural and surest way to equalize conditions is to aid all ships and to give them all the same measures of assistance; that in this way Government aid will most surely contribute towards a well-rounded development of shipping, with an increase in passenger steamers, cargo steamers, etc.; that this does not discriminate, but helps the weak as well as the strong; that it treats all alike. Many bills for general subsidies have been introduced into Congress, but none has ever become law.

On the contrary, others contend that, from the standpoint of practical results, the most certain method of increasing the merchant marine in international trade is to pick the strongest lines, and give them such assistance as will enable them to meet foreign competition successfully and increase the tonnage of their fleets year by year. They point out that the weak lines are ultimately benefited by this policy, as tramps are built and engined in shipyards created and developed by the subsidies given to the large lines; also that the companies which own subsidized vessels generally own ordinary commercial tonnage, which indirectly shares the benefits of the subsidies.

Again, it is claimed that by picking out the routes of most commercial importance to the United States, and by giving considerable aid to secure and maintain efficient steamship service over these routes, the Government could obtain immediate and definitely measurable returns for the public funds expended; and that in the progress of the maritime interests of the United States more can be hoped to be gained from promoting the growth of companies capable of maintaining well-organized and quick service than from scattering Government aid over the entire registered tonnage.

Tonnage Bounties.

Adam Smith, in this connection, points out in his "Wealth of Nations" that under a tonnage bounty it was not unusual for vessels to be fitted out for the sole purpose of securing the bounty. Even to-day it is charged that French shipping lines sometimes choose the longest routes because of the mileage bounty paid by the Government, just as the packing-house industries in the Middle West prefer to route their shipments through the port of New York rather than the ports of Philadelphia and Baltimore, for the reason that as the distance is longer to New York and they are allowed a mileage haul by the railroads for the use of their refrigerator cars, the revenue accruing to the packers is greater. The fear is often expressed that a subsidy payment once begun as a temporary policy



(Photo: W. Parry & Son.)

T.S.S. ANTENOR FOR ALFRED HOLT & CO. (BLUE FUNNEL LINE).

(Constructed by Palmers Shipbuilding and Iron Co., Ltd., Jarrow-on-Tyne.)

will become permanent, just as the import tariff policy has become a constant; and it is also alleged that an artificially supported industry is frequently not managed in as efficient a manner as one which exists solely by reason of being able on its merits to meet and overcome all competition.

Subsidies are ordinarily assumed to be similar to a protective tariff, but this is not always the case. Under a protective tariff the home consumer must usually pay for the protection in the form of higher prices for his goods, and is often inconvenienced by restriction of output. Shipping subsidies, strictly as such, however, cannot increase the rates of transportation overseas, and they may conceivably lower the rates.

The Shipping Subsidy Bill of 1922–23 called for an expenditure of from 20 to 30 million dollars a year. This bill passed the House of Representatives—the very first time in the history of the country that a general shipping subsidy measure had ever been approved by that body. It undoubtedly would have passed the Senate of the United States also and become a law but for filibustering tactics engineered by a few of its opponents, members of the majority party voting with the opposition.

There is without a doubt much dislike in the country for the word "subsidy" and the policy for which it stands. This has arisen from a suspicion that, with the possible exception of the bill introduced into Congress in 1912–13, every subsidy measure ever proposed emanated from persons more concerned with their personal interests than with any advantage to the country, and that resolutions adopted by Chambers of Commerce and Boards of Trade merely reflected the opinions of the shipowning members of these bodies. Indeed, many believe it will never be possible to educate the public into an acceptance of a ship-subsidy proposition, and this has made even some steamship owners lukewarm on the subject. It is worthy of remark, in this connection, that the President of the Dollar Steamship Company is emphatic in the declaration that he does not consider a subsidy necessary for the promotion of American shipping.

A "Subsidized Industry."

(F) As a matter of fact the present Government-owned merchant marine is a subsidized industry, from the fact that the yearly losses incurred in the operations by the Government have to be made up year by year by direct appropriation from the United States Treasury. It is estimated that the best that could be hoped for from operation by the Government under its existing organization would be a reduction of the loss from \$17,500 to about \$8,500 per vessel on the round voyage, with the prospect of a better showing if trade conditions should improve and freight rates could be increased; that probably the same vessels under private ownership would reduce the loss per voyage to about \$4,500; and that to-day a British owner under the same conditions would about "break even."

Despite the hard knocks to which the subsidy proposition has been subjected, advocacy of this plan still survives. Studies are

now being made by the Legislative Committee of the Shipping Board in that direction; and investigations of the shipping problem now being made by the United States Chamber of Commerce are expected to lead to the same end. It is understood that a study of the history of shipping legislation is being prepared for the information of the President of the United States, covering Congressional inquiries into the question as far back as 1869. It is claimed that testimony at Congressional hearings then foresaw shipping conditions of to-day which would call for a subsidy as a solution of the problem.

Under present conditions Government shipping experts now estimate that financial aid to private steamship lines would cost the Government seven and a half million dollars for cargo routes and seven and a half million dollars for passenger lines, a total of fifteen million dollars a year, to cover from four to five million tons of privately owned ships. Compared with the estimated loss by continued operation of the Government fleet of about forty million dollars per annum, it is contended that a subsidy would save the taxpayers' money. This fits in perfectly with the President's cherished plan of retrenchment and economy in Federal affairs, and is likely to make a powerful appeal to him.

Three Possible Courses.

Summarizing, the advocates of these proposals allege that but three alternatives face the country in respect to its merchant marine in foreign trade. First, continued operation by the Government at a loss ultimately around $40,000,000 a year. Second, Government aid to private shipping companies, amounting to about $15,000,000. Third, the gradual but certain disappearances of our flag in international routes and a return to pre-war conditions, when less than 10 per cent. of our foreign commerce was carried in American bottoms.

There are indications that there is strong opposition within high administration circles to any suggestion for a ship subsidy. This opposition is based largely upon a belief that at the next session of Congress efforts will be made to enact agricultural legislation, which in effect amounts to a farmers' subsidy, though the Administration thus far has consistently opposed direct financial aid to agriculture. The argument advanced by the opposition is that if there are proposals for a ship subsidy and also for a farmers' subsidy, the inevitable trading will develop, leading to the adoption of both measures.

There are even those who believe that if the three alternatives given covered the whole problem, the taxpayer would answer in favour of a return to pre-war conditions, since there are many reasons that would prompt him to do so. They claim that he would not begrudge the foreigner the business of ocean-borne commerce if that meant cheaper carriage for American goods, as the American could then use his own money to better advantage; that cheaper freight rates would mean cheaper goods, and gains from this source would offset some disadvantages due to dependence upon foreign shipping; that the American people have not been sold on the theory

that this dependence upon foreign shipping places insuperable obstacles in the way of selling goods abroad, as they would look to competition among foreign steamship owners for protection; and that while there may be pride in having the American flag on every sea, there is a limit to what the taxpayer would be willing to pay to gratify even this.

It is admitted by these dissidents that there is a belief in a large and diversified merchant marine as essential to national defence, and that when national safety is brought into the picture this belief will readily cause the taxpayers to loosen their purse-strings. Nevertheless, the feeling still prevails that a subsidy means easy money—and this is the difficulty in a nutshell—though it applies to private operation in less degree than to Government operation.

If agreement could be reached on the facts, on Government as compared with private operation, on the amount of subsidy required after one plan or the other is adopted, and if the alternatives set forth were accepted as the only recourse, there would remain but two questions to decide: How much are the American people willing to pay to have American goods carried in American ships to promote American trade? and, How deeply are they convinced that maintenance of an American Merchant Marine is necessary to national safety?

Ship Sales to Private Owners.

The Merchant Marine Act of 1920 prescribes that the Shipping Board shall sell as soon as practicable all the vessels owned by the Government on such terms and conditions as the Board may prescribe. The Board is also directed: To determine what steamship lines, to be established from ports of the United States, are in its judgment desirable for the promotion of the commerce of the United States, with a view to furnishing adequate, regular, and permanent services; to sell the Government-owned ships to citizens of the United States who agree to establish and maintain such lines upon such terms and conditions as to the Board may seem just; if no such citizen can be secured, to supply either with his own ships or with vessels purchased from the Board such services, on terms satisfactory to the Board; to itself operate vessels on such lines, until the business has developed so that vessels may be sold on satisfactory terms, or it shall appear within a reasonable time that such lines cannot be made self-sustaining.

The Board is now at last limiting its activities so as to interfere to the least possible extent with private American steamship owners, but until it has evolved a more definite policy it will continue in the nature of a menace to private enterprise. The President of the Fleet Corporation has intimated that he intends to push the sale to private interests of Government-owned vessels and routes. In good faith he tells the operating agents of the Government-owned vessels that as they, in his opinion, are regarded as potential purchasers, they should come forward and negotiate for the purchase of the ships and routes they are now operating. If they do not do this he will strive, in accordance with the mandate of the Merchant

Marine Act of 1920, to sell them to others, or have others substitute privately owned ships on the routes. Also the President of the Fleet Corporation is on record to the effect that while he expects to reduce the loss incurred by the Government in operation of its existing fleets, yet the merchant marine can never be operated at a profit and as a complete success, because it is not possible for any Government to handle it as successfully and with as little loss as if it were in the hands of a private owner.

Limits of Government Action.

The Chairman of the Shipping Board insists that where the country cannot have private operation (which means while private American steamship owners will not undertake to cover the routes considered essential to American commerce), there must be public operation, and that under such circumstances the American flag under Government operation is going to stay upon the high seas, maintaining that if the Shipping Board during the last few years had not expended money to establish routes and develop shipping business there would be no operation, and that America would to-day be as conspicuous for her absence from the ocean as in 1914. The Shipping Board, in pursuance of this declaration, has intimated that Government-owned vessels will not be withdrawn from any route now operated by them unless upon a guarantee that private ship-owners will undertake to continue to operate the route for five successive years.

Despite this attitude of the Shipping Board, there is abundant contemporary evidence that the most sincere votaries of Government ownership and operation of public utilities throughout the country shrink from the proposition that the Government continue indefinitely in this world-competitive enterprise. The policy of the Shipping Board has been to assign their vessels to be operated by private companies to enable them to acquire experience in foreign trade. In the opinion of those who know the ropes, however, the weakness of this system lies in the fact that most of the managers of Shipping Board services are empowered to act merely in the capacity of loading agents, rather than as managers. Their personal initiative is muzzled by the close supervision and control over their activities exercised by the Fleet Corporation's representatives. Also the form of operating agreement where compensation is based on the gross freights is wrong; the return to the manager should be on the net results of his operation.

The Shipping Board's Constitution.

There is an additional aspect of the shipping situation in the United States. The law governing appointments to the Shipping Board, which provides that the Commissioners shall be selected from different sections of the country, has had its inevitable consequence. Each Commissioner has been particularly solicitous in seeing that to the port or ports in the section which he represents have been

allocated shipping lines, regardless of whether the present or future outlook of cargo offerings warranted their installation and continuation.

The ostensible theory on which many of the shipping lines at such ports as Mobile, Pensacola, Jacksonville, Savannah, Charleston, and even Norfolk have been instituted, is that the Atlantic Coast has so many splendid natural ports other than New York, that it is unjustifiable from an economic standpoint for a tremendous proportion of the traffic of the whole country to move through that single funnel. It was therefore considered essential that an effort should be made by the Shipping Board to alter this state of affairs by furnishing a sufficient frequency of sailings from these outer ports to stimulate and attract a proportion of the flow of traffic through them and away from New York, even though it meant an initial loss to the Government before they had established a goodwill and attracted sufficient patronage to make them self-sustaining.

While this would be a sound hypothesis with respect to such ports as Philadelphia and Baltimore, on account of their excellent rail connections with the great manufacturing sections of the Middle West, it does not hold good so far as the South Atlantic and some of the Gulf ports are concerned. There is little likelihood, at least in the immediate or near future, that they can hope to be put on a remunerative basis. Nor can it be demonstrated that, operated at a loss, these routes are essential to the commerce of the United States. Now that the control of the routes to be maintained by the Shipping Board has been almost entirely taken away from the Commissioners and vested in the President of the Emergency Fleet Corporation, and that, in compliance with the wishes of the President of the United States to reduce taxation, that official is making substantial retrenchment in the expense incident to the operation of the Government-owned ships, the probabilities are that his energies in this direction will not overlook the proposition that the prospect of maintaining these lines from the South Atlantic and Gulf ports on a paying basis is hopeless, and that when satisfied of this he will have them withdrawn. If this should be determined, naturally no private steamship line would be disposed to replace these services.

Waste and Bungling.

Comments throughout the country in regard to the activities of the Shipping Board may be summarized to the following effect: Waste and bungling have been the main achievements of the United States Shipping Board. Created in 1916, in nine years it has had seven chairmen, and only one of these has been a man with any experience in shipping. It is strictly within the truth to say that no agency of the Government is so generally discredited among business men as this organization. Internal quarrels have been its vocation and avocation. Money has run through its hands as water through a sieve.

In nine years it has expended $3,523,000,000. Probably not more than $200,000,000 has been realized from the sale of ships and

materials. The net loss in the nine years has been over $3,000,000,000. There have been years when this experiment was costing $16,000,000 per month. That figure has been cut to a little less than one-fourth of what it reached at its peak. But the question before the country now is whether or not the Shipping Board, the Emergency Fleet Corporation, a few ships in operation, and several hundred chained together are worth $40,000,000 a year. Tankers are the only craft showing a profit. The 308 cargo boats showed a loss last year of $27,393,824; the fifteen or more passenger ships a net loss of $4,420,850. It required eight millions to recondition the Leviathan, and in thirteen voyages she lost $1,026,000. It is not necessary to accept as true one-half the stories current in Washington to realize that the Shipping Board has lost whatever opportunity it ever had to gain the confidence of the country for its policies and recommendations. It has never looked facts squarely in the face nor displayed the ability to formulate policies which shall keep pace with the evolution of commerce, transportation, and communication.

And there is admittedly no hope for better days. The Administration believes the Government should get out of this costly adventure. It is well known that the President is greatly dissatisfied with the situation. He has publicly expressed his desire that the Board should give the Emergency Fleet a free hand in respect to ship operations, and that all negotiations for the sale of tonnage should lie with the Fleet Corporation, even if the Board reserves the right to give its final approval. The country is tired of the Shipping Board, and since the number of its employees has been cut from 12,798 to 2,243, Congressmen hunting for jobs for constituents have lost interest in it. About the only element wishing the Government to continue the experiment is the jobholder of high and low degree.

There is a minority group on the Board hiding behind the moth-eaten slogan that "America must have ships." But the country as a whole has at last faced the fact that the Government experiment in shipping has been a gigantic mess and a costly experiment, and has come to the conclusion that whatever may be done with the ships, the Board should be abolished and its left-over activities transferred to some existing department.

Popular Misconceptions.

The war, as has been said, brought shipping into a prominence unprecedented in many years in the United States. It is hardly too much to say that the majority of the people had up till then little knowledge of, or interest in, sea-borne commerce. During the war the slogan "Ships, more ships, and still more ships," became one of the necessities of victory. To meet the demands of the war a large part of the working forces of the nation was, in one form or another, engaged in the hastily improvised shipyards, and the quantity construction of ships became a foremost consideration throughout the length and breadth of the land. In the short space

of two years, shipping, from a position of relative unimportance, became a matter of national concern.

As it was with the actual building of new vessels, the publicity regarding them and relative problems fell largely into the hands of those previously little acquainted with maritime matters, and without knowledge of the broader aspects of international commerce or the economics of world trade. Thus it is not surprising that when the war was concluded and the fleet built, the general opinion, with the comparative few who possessed real knowledge of the underlying factors of the situation, was that henceforth America would take its place in the front rank of maritime nations. The ships existed. All that was necessary was to use them! And this idea is abundantly in evidence even to-day.

It is likewise unquestionable that there is a large element of ill-informed public opinion which cannot be made to believe that two or three hundreds of the ships in the American laid-up fleet are economically useless in the light of present and future shipping needs. Such people look with suspicion at any idea of wholesale junking of ships which can float, and which have superstructures looking pretty much like those of any other ships that sail the seas.

Actually, of course, the majority of those idle ships are useless for the maintenance and upbuilding of the American merchant marine. To casual observers it appears also that all of the American coastwise steamers trading on regular routes between the larger ports on the Atlantic Seaboard are identical in design and construction, though varying somewhat in size; they look so much alike from outward appearance. It is a fact, however, fully appreciated by practical steamship owners, that all of these steamers have internal and external peculiarities, particularly the former, adapting them for the individual cargo requirements and handling of the vessels of each particular trade.

So much is this the case that a ship constructed for one route cannot be profitably employed permanently on another route without extensive and costly alterations, and even then not so profitably as a vessel originally constructed for its own individual route. These peculiarities in construction of vessels for particular routes are the result of long years of accumulated experience, consultation, and accommodation on the part of the traffic and operating officials of each steamship company. Unlike the man in the street, the successful steamship owner must be cruelly practical, must look things squarely in the face, and realize that the world is dynamic, not static —a process, not a structure.

The Liners Appeal to the Eye.

It is also unfortunate that most of the people of the United States, whose ideas form what is commonly designated as public opinion, think in terms of the Great Atlantic Liners. Such steamers are most in evidence to the travelling public who reside in or pass through the large seaports, and the size and magnificence of these craft make an emotional appeal to the eye and to the mind. Great

Britain stands unrivalled, however, as the world's cargo carrier—and it is the tremendous number of her large and first-class tramp steamers, with their enormous cargo-carrying capacity, which gives her this preponderance over every other country as a maritime nation. In all the seaports of the United States on the Atlantic, the Pacific and the Gulf, away from the usual berths of the large passenger steamers, the cargo carrier is everywhere in evidence, though hardly ever noticed by the travelling public.

Not the least disconcerting element in the situation is that steamship owners encounter among the merchants of the United States a constant clamour for direct steamship service to and from ports, which would be of benefit to these merchants, but which the volume of freight offering would not justify any steamship company in installing. Such merchants usually base their claims for these services upon the probability of the steamship company eventually building up a lucrative trade. This, of course, implies that the steamship company must hold the bag until this has been accomplished, if it ever does materialize. And even if a steamship company should undertake to install such a service, at an initial loss to itself, and eventually make it a paying proposition, there is no guarantee that the shippers or consignees, who had reaped the benefit of the steamship company's sacrifices, would continue to patronize the same line should a competitor, who had done nothing to build up the trade, seek to enter the field. Of course, under existing conditions steamship companies have no reserve funds to warrant them in entertaining any such proposition.

The Welter of Opinions.

A mere superficial perusal of the foregoing will suffice to make clear the welter of opinions and the bewildering confusion of ideas concerning the merchant marine of the United States, with their embroidery of mere catch-words, devoid of real meaning or without foundation in fact.

The weight of opinion is that since the conclusion of the World War all connected with it, including governmental representatives and private steamship owners, have simply wobbled; backing and filling, merely making gestures. Congress in its Shipping Acts of 1916 and 1920 has not even approached a practical solution of the problem—which is not surprising when its magnitude and complexity, combined with the possibilities and limitations of the construction, management, and operation of ships are considered. Even the American system of Government, admirable as it is in many respects, does not conduce to a solution of the problem.

The reference of proposed legislation to Congressional Committees whose membership with few exceptions changes every two years (as is the case in the lower house of the national legislature), does not provide a body of men trained to understand even the rudiments of the factors controlling the problem of the world's competition for international carrying trade. This difficulty is aggravated by the fact that a large preponderance of the legislators come from

committees far removed from the sea, who, in the nature of things, have had no opportunity either to understand or actually to realize the situation.

Contrast this with the record of the British Parliament where the list of members interested in maritime affairs shows the surprisingly large representation of 17 shipowners or shipbuilders in the House of Lords and 92 in the House of Commons, a total of 109. The Board of Trade in Great Britain is practically the censor of the law-making power of that nation in connection with its merchant marine, and one never hears of any friction between that body and Parliament, for the reason that the latter has confidence in the experts of the former, who are selected for their experience and special fitness.

What the outcome in America will be is difficult to forecast. Unforeseen circumstances are so numerous that it is next to impossible to make any kind of prediction with any degree of certainty. As one keen observer remarked: "We may be on our way, but we don't know where we are; and the only thing of which we really are sure is the absolute uncertainty of the future." The nearest approach to a logical conclusion would seem, therefore, to be that, as most problems work themselves out if you give them sufficient leeway, Father Time alone will solve this riddle.

There are many reasons for assuming, however, that the declaration in the very first paragraph of the Merchant Marine Act, 1912, that "it is necessary for the national defence and for the proper growth of its foreign and domestic commerce that the United States shall have a merchant marine of the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency, ultimately to be owned and operated privately by citizens of the United States," should be taken, perhaps not as a mere meaningless, political gesture, but rather as a definite expression of the country's considered opinion.

J. R. GORDON.

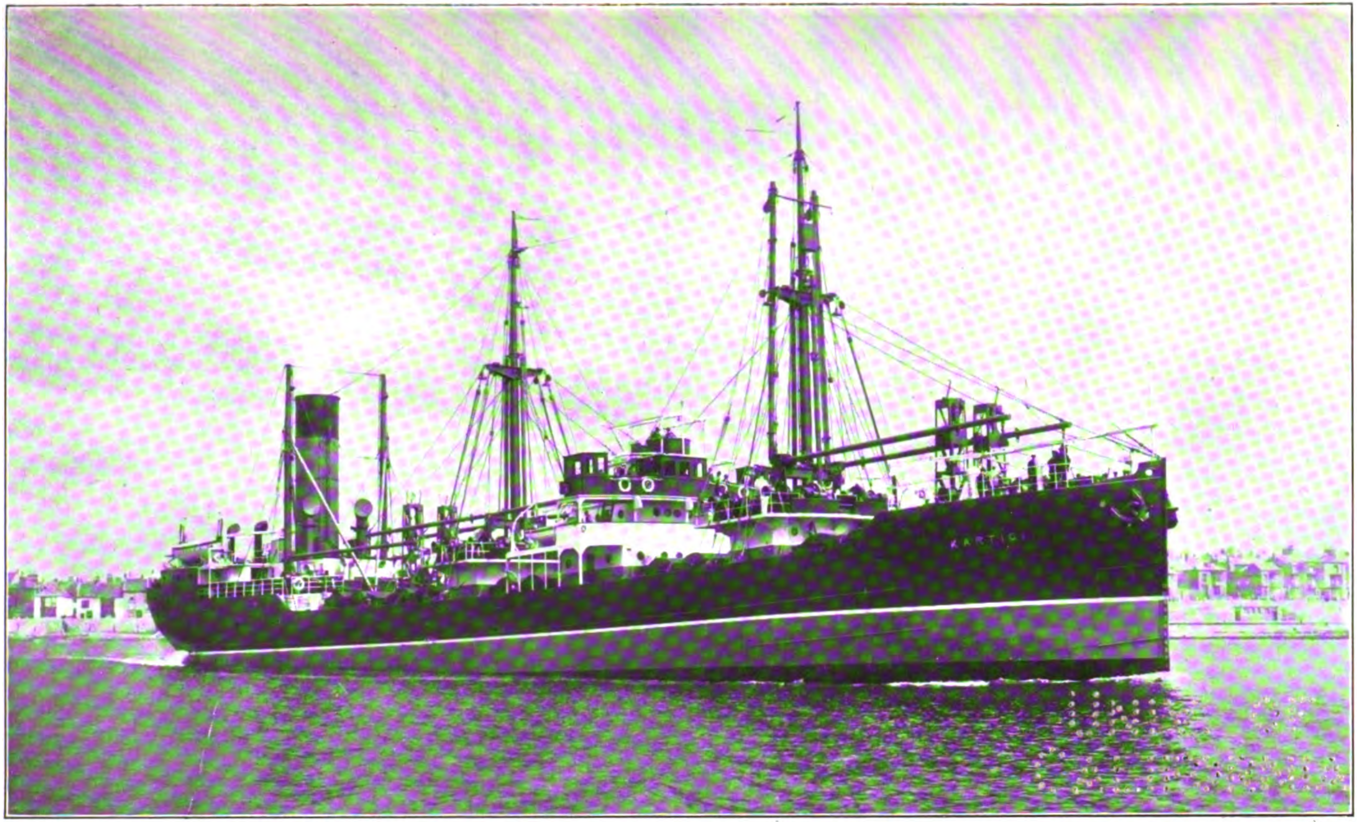
CHAPTER XIII.

Bulk Cargoes—Their Effect on Ship Design.

All merchandise carried by sea may be placed, by reason of its characteristics, into one of two groups, and may be considered as either bulk freight or package freight. Package freight is that which, broadly speaking, will stow anywhere on board ship, but bulk freight has to be carried in certain parts of the ship; moreover, the latter often has characteristics which render the ship, by reason of its special construction, useless for the carriage of any other type of cargo. A bulk cargo when loaded on board ship stows *en masse;* it cannot be handled by winches and derricks like a package cargo, and consequently requires special loading and unloading arrangements; furthermore, owing to the way in which it stows, its density, and general distribution of its weight, such cargo has a considerable effect—longitudinally—upon the strength of the hull structure and—transversely—upon stability. An insufficient appreciation, or a careless disregard of these points has without doubt been responsible for a considerable number of the marine casualties—where ships have been lost at sea with all hands—during the past eighteen months or so, and it seems not without interest, therefore, to discuss some of the more important points in connection with bulk cargoes and their effect upon the design and general arrangement of merchant ships. Bulk cargoes are among the most numerous and important carried at sea, and they form some of the most important "return" cargoes for ships engaged in certain trades from Great Britain.

The Principal Bulk Cargoes.

The principal bulk cargoes are grain, iron ore, oil, and coal, and it is interesting to discuss their distribution and sources of supply, considering Europe, and in particular Great Britain, as the chief importer and exporter. Grain is, from a national point of view, one of the most important bulk cargoes, because it is a food base which we are unable to produce in sufficient quantities for our own use. We import it in large quantities, exporting in return coal and manufactured goods. With the increasing use of crude petroleum both for maritime fuelling purposes and, in distillate form, for land vehicles, the demand for coal has decreased slightly and the export figure has dropped. Whether this will continue and what the ultimate effect would be, it is interesting, but unpleasant, to consider; but that problem scarcely comes within the scope of this



(*Photo: Frank & Sons.*)

S.S. KARTIGI FOR THE UNION STEAMSHIP COMPANY OF NEW ZEALAND, LIMITED.

(*Constructed by Messrs. Wm. Gray & Co., Ltd., West Hartlepool.*)

review. At present there is still sufficient demand for coal, both in the coastwise and overseas trades, to make the construction of colliers a necessity.

Grain is imported to this country from Canada (Montreal), from America (New York, Philadelphia, New Orleans, and Galveston), from the Argentine (Buenos Aires), from Australia (Sydney and Melbourne), and from India (Karachi), and in each case it is the endeavour of the shipowner operating vessels on these routes to arrange for his ship to take out some cargo to the grain loading port, or to a port near it, which will obviate the ship running in ballast one way. This, of course, is desirable with all bulk cargoes, but, as will be seen later, it is not always possible owing to the nature of the cargo. Grain, however, permits of an arrangement of hold in which other cargoes can be carried, and the outward cargo varies with the destination. Vessels running to Canada, for example, carry a general cargo, including agricultural machinery; to United States ports, unfortunately, it is usually necessary to run light, because that country takes very little of our products.

Grain, of course, is a seasonable cargo, and this is one more fact which points to the necessity for grain ships being able to carry other cargoes if necessary, because, however great the demand for grain tonnage during the season, it is not profitable to lay a ship up for the rest of the year. Incidentally, this has to be done in the case of freighters of the bulk cargo type which run on the Great Lakes of North America; but it is a question purely of weather conditions because the lakes are frozen and impassable to navigation during the winter months. To Karachi, vessels running out for Indian wheat generally take out a cargo of coal from Welsh ports, the cargoes both ways in this case being of "bulk" nature. To the Argentine a favourite outward cargo is a deck load of locomotives and railway rolling stock.

Oil is a purely "one-way" cargo, and the ships which carry it can take no other cargo on the outward run by reason of their special internal construction. Oil is not, fortunately enough, a seasonable cargo, and since it is always available, and continually in demand, the shipowner finds it a paying proposition to keep fleets of tankers at work. The principal sources of oil are Mexico (Tampico being the export port), Texas (Port Arthur), Mesopotamia (Abadan), Trinidad, Burma, Java, and Sumatra. In its crude state, as obtained from the wells, petroleum is of very little commercial use, and it has to go through various distillation and separation processes before the results are marketed. Oil refineries for this purpose are situated sometimes at the loading port and sometimes at the discharging port.

As far as Great Britain is concerned, the principal sources of iron ore are Northern Spain and Sweden. She has also her own deposits of ore, but these are not sufficient for the needs of all the steel furnaces, and considerable quantities of ore are imported from the two sources mentioned, both of which are deficient in coal. The return cargo in each case consequently is coal, from the North-East Coast or South Wales ports. Coal is also shipped outwards in British

and Scandinavian bottoms by ships which bring over pit props from Scandinavian ports.

Bulk Cargo Ship Characteristics.

Sufficient has now been said to give an indication of the principal bulk cargoes and of the directions in which they are exported and imported. It is now proposed to examine the characteristics of the various types of bulk freighters in more detail, remembering first one or two salient features common to all bulk cargo carriers. A bulk cargo does not stow readily like a package cargo, and also if it "shifts," due to the rolling and working of the ship in bad weather, the tendency is for it to shift quickly and bodily with unfortunate effects upon the stability of the ship. Hence ample provision must be made to divide up the mass of the cargo as much as possible. Also, as mentioned previously, bulk cargoes cannot be loaded and unloaded like ordinary cargoes, and special arrangements have to be made for handling them either on the ship or on shore. It is a very debatable point whether it is worth while going to the extra expense of fitting all types of bulk cargo carriers with self-unloading appliances, and, in the main, it will be found to depend on the service upon which the ship is engaged, and exactly how specialized the nature of the cargo is. Much depends also upon the size and general arrangement of the plant required. Thus, a collier engaged in continuous service between this country and the Continent, on a service moreover where a definite cargo is always assured, might profitably be fitted with self-unloading gear, assuming the gear, by reason of bad distribution of weight, had no detrimental effect on her stability. If, however, the demand for coal cargoes fell away, this ship could not be employed profitably in any other trade either bulk or package. Coal, however, is not a seasonable cargo like grain. The grain carrier must be able, when grain is out of season, to carry other cargoes, and hence it is unwise to fit such a ship with self-unloading gear. The oil tanker, on the other hand, can carry oil only, or in some cases molasses, in her tanks. When oil is not being carried, *i.e.* when the ship is in ballast, sea water must be admitted to a sufficient number of tanks to permit of proper immersion of the propeller and to give the ship a safe metacentric height. Oil, moreover, is a liquid cargo—the only liquid incidentally of all the bulk cargoes—and can be handled readily by pumps which, as far as the ship is concerned, are comparatively compact, and can be fitted conveniently in a part of the ship low down between two 'thwartship pairs of tanks.

The same question of ballasting, it should be noted, occurs in the case of colliers specially designed for a "one-way cargo" service, and for such vessels a special form of construction has been evolved, in which triangular ballast tanks are arranged at the ship's side, two sides of the triangle being formed by the deck above and by the ship's side respectively. This system of construction is extremely useful for bulk cargo carriage because it allows hold pillars to be done away with, at the same time not taking up space required by the cargo, since a bulk cargo does not stow usually in that part of

the hold. The grain carrier which must, except under special circumstances, be a general cargo carrier also, has provision made against incorrect immersion of the propeller when running in ballast by the provision of a deep tank or hold between two watertight bulkheads, usually just abaft the machinery space, which can be filled with water, and which has watertight hatches.

The foregoing remarks have given an indication of characteristics common to all bulk freighters, and it is interesting now to examine the characteristics of some individual types in more detail. It should also be mentioned that the bulk freighter is indicative of the present-day tendency towards standardization and specialization in ship construction. The pure ocean tramp is tending to disappear with the formation of large shipping combines.

The Oil Tanker.

The oil tanker is the most specialized of all bulk freighters, as has been pointed out, because it can be used for liquid cargoes only—oil or molasses in bulk, or water. The effect of a surface of free liquid in a ship's hull on the stability is well known, and this effect has to be guarded against in the oil tanker. Oil, when carried in bulk, expands in bulk with rises in temperature and correspondingly contracts with falls in temperature, a condition which has to be allowed for in the hull structure arrangement. Oil in bulk rests directly on the skin of the vessel, and has a tendency to "weep" through the most carefully riveted joints; this necessitates specially close riveting, and a rigorous caulking of joints. Owing to the particularly "deadweight" nature of the cargo, and also to the fact that when in ballast the tanker is a long girder-like structure, longitudinal shear stresses and bending moments are apt to be high, and a longitudinal system of hull construction has been evolved specially with the object of reducing these to a minimum.

The modern oil tanker is the outcome of forty or fifty years of development, and is designed to take all the foregoing factors into account. A tanker designed for the transport of oil in bulk or molasses in bulk carries its cargo in a series of tanks arranged on either side of a continuous vertical centreline bulkhead, bounded by the shell of the ship and by the deck overhead, the centreline bulkhead serving to break up the free surface of the liquid. These tanks are separated, one from the other, by transverse bulkheads and extend for slightly over two-thirds of the length of the ship, their continuity being broken only by a compartment which carries the necessary pumps for handling the cargo.

Provision for Oil Expansion.

Machinery in oil tankers is invariably aft. This arrangement has the advantage of securing the continuity mentioned above, as well as of eliminating the necessity for oil-tight riveting throughout the shaft tunnel. The machinery space and the fore peak and forward

end of the ship generally are isolated from the tanks by means of double oil-tight bulkheads or cofferdams. Expansion of the oil is provided for by means of *expansion trunks*, which are portions of the tanks at the top above the main strength deck bounded by a vertical fore-and-aft bulkhead running along this deck at about half the moulded half breadth of the ship from the centreline. The expansion trunk is in effect a narrowed continuation of the main tanks, and presents the appearance when viewed externally of a long trunk erection running the whole length with access hatches arranged on the trunk top. In the majority of ocean-going oil carriers the ship's side is carried up level with this trunk top and the latter is extended out horizontally to meet it, and thus, if the transverse bulkheads be continued up to the trunk top, a further series of tanks known as *summer tanks* is formed, adding to the deadweight carrying capacity of the ship. Furthermore, the trunk top now becomes the strength deck of the ship, the latter being virtually of shelter deck type with one tier of 'tween decks beneath. A great many tankers, notably those of the Eagle Oil Transport Co., Ltd., follow this plan and are of shelter deck type, a suitable bridge erection being arranged amidships. Others have a full topgallant forecastle, a bridge deck, and a poop above the strength deck.

Besides having pumps and complete pipe-line arrangements for discharging cargo in main and summer tanks, oil tankers must have also a series of steam pipes arranged in the tanks for heating the oil cargo to prevent it from becoming too viscous when the ship is passing through cold climates, and also a separate pipe arrangement for "steaming" or cleaning the tanks after one voyage, when oil of a different type from that previously carried is to be shipped in the next cargo. For this reason, in addition to the fact that steam-driven cargo pumps are always very reliable and economical in operation, an oil tanker must have steam boilers on board even if, as is the case with so many modern tankers, she is propelled by internal combustion engines. The reciprocating engine, taking steam from Scotch boilers, formed the propelling machinery of the majority of oil carrying built up to early in 1919, and then for a space the geared turbine had a vogue and a number of tankers were so fitted. The vogue did not last long, however, because trouble was experienced with the gearing, there being several cases of tooth stripping on the gears, and especially on those of double reduction type.

The Tanker's Power Problem.

An oil tanker is rather a special problem from the powering point of view, because if the machinery is aft, as is usually the case, and it is generally conceded that the best position is aft, there is only a very short length of shafting between the propeller and the prime mover, and any shocks taken up by the former are very quickly and suddenly transmitted to the latter. Also an oil tanker, when running in ballast, is a long girder-like structure, and there is a danger that the natural period of vibration of the ship may approach

very nearly to synchronization with that of the main engines, when the latter are running at a certain number of revolutions per minute, resulting in very unpleasant effects upon both the engine and the hull structure. Considerable care has to be exercised to avoid the "critical" revolutions in the design stage. The internal combustion engine is now being adopted as the main propulsive power in an increasing number of oil tankers, usually, for reasons mentioned above, in conjunction with steam or steam and electric auxiliaries. Many motor tankers are twin engined ships, but the tendency at the present time is to fit a slow-running double-acting engine, some large 10,000 ton deadweight tankers at present under construction in this country and in the Netherlands for the Anglo-Saxon Petroleum Company having single sets of four-stroke cycle Diesel engines of double-acting type.

Ore Carriers and Colliers.

There are two questions which at once arise in connection with ore carriers, and these are, firstly, handling of cargo, and, secondly, stowage. The former question has been touched on already. Ore of any type is very awkward to handle. "Unit" unloading in baskets is impracticable, because it is too expensive and takes up too much time. Loading is an easier matter, being merely a question of gravity; this incidentally applies to all bulk cargoes with the exception of oil. Unloading, however, requires either some form of mechanical grab worked from the shore and capable of dealing with the cargo in large "bites," or some endless belt system on the ship. Various elaborate mechanical devices may be fitted on board ship, but whether they are profitable depends, as already stated, on the service upon which the ship is engaged. Where an ore carrier is engaged on a definite service between two fixed ports with cargoes assured, and where good unloading plant is fitted at the terminal port, it is not necessary to fit cargo handling appliances to the ship at all, and her first cost and upkeep bill are thereby reduced. This is the case with specially designed bulk freighters such as one finds on the Great Lakes of North America; but where the ore carrier is also a general cargo carrier—a tramp, in fact,—it is advisable to fit the usual winches and derricks. Quite a large proportion of the world's ore supply, it should be remembered, is carried in bottoms which also carry coal on their outward voyage, and may, if occasion arises, carry grain in season. Since such ships have, as it were, a treble rôle, it is necessary for the sake of economy that the number of fittings of a type peculiar to one cargo should be reduced to a minimum.

Self-unloading Freighters.

Some owners of ore carriers—and the remark applies to colliers also—running on special services between fixed terminal ports, have decided that it is cheaper in the long run to fit their ships with self-unloading devices, which will render them independent of

the shore plant; but this, while very sound from a theoretical point of view, has not always proved successful in practice, and in many cases the stability of the ship has been impaired. Endless-belt systems have been adopted in most cases, the floors of the ore or coal holds being constructed to slope downwards towards the bottom of the ship, and being fitted with hinged flap doors, which allow the cargo to fall out under gravity on to the endless belt running in passages made by the slopes in the hold bottoms. Once on the belt, the cargo is carried upwards and sternwards, being transferred to another belt system, to be discharged finally through chutes into barges alongside. A modification of this idea has also been adopted, and consists of a line of "baskets" on trucks running in the passages under the holds to the bottom of circular trunks, up which they are lifted by cranes on the deck overhead to be discharged over the ship's side. Both of the systems are rather elaborate to be fitted on shipboard, and although they work successfully, have not been adopted extensively.

In bulk freighters on the Great Lakes of North America, the self-unloading freighter for ore carrying has been developed to a considerable extent, and systems are in operation whereby the cargo is carried to the deck in the usual manner and then transferred to a belt conveyor on a long cantilever arm constrained to rotate through 180 degrees in a horizontal plane, which permits of cargo discharge on either side of the centreline.

Coming to the second problem in connection with ore carrying, the question of stowage is one which concerns stability chiefly. Ore is a very heavy cargo, stows in pyramid-like heaps, puts a ship well down to load line before the hold is actually full, and hence tends to bring the centre of gravity of the ship down dangerously near to the centre of buoyancy with consequent loss in metacentric height. This consideration, together with the fact that it is necessary for an oil tanker to run one way light, was taken into account in some interesting combination ore and oil carriers constructed recently for service between North and South America, the outward run being made with oil and the return run with ore. The ore is conveniently carried in a sort of centre pocket fairly high up in the ship's structure, oil or water ballast being carried both alongside and underneath, in what is virtually a "U" shaped compartment, the arms of the "U" serving the purpose of expansion trunks.

Hatch Covers.

The hatch covers of these ships' ore holds are of interest, as they are of a special steel fabricated type which has been applied to a number of colliers. The ordinary system of hatch covering, as is well known, consists of a series of wooden boards resting on steel fore and aft or 'thwartship beams, which together with these latter must be removed during unloading. The hatches under consideration, however, are complete steel structures, being composed of semi-circular sweeps of plating riveted together on

alternate sides of a common centre line, with a strong boundary bar. The hatch can be lifted complete by derricks, and for work on bulk freighters running on fixed services from the same terminal ports where cargoes are definitely assured it has many advantages. With large wide self-timing hatchways—a desiderata in all colliers—it may tend to become unwieldy, although the steel structure can be conveniently divided into sections each controllable by a derrick. Recent Board of Trade inquiries have shown that colliers have been lost at sea with all hands owing to heavy seas breaking in their hatch covers and causing the vessel to trim dangerously by the head. This is especially the case with ships of well deck or three island type where a heavy sea is liable to pour in over the forecastle head, and indicates the desirability of fitting steel hatch covers of the type mentioned.

The desire for wide clear pillarless holds in cargo vessels which are likely to have to carry ore or coal in bulk has led to the evolution of special types of hull structure of which one, the topside ballast tank system, has been mentioned already. This, incidentally, is ideal for ore and useful for coal carrying, on account of the way in which these commodities stow, but it is not usually adopted for grain because this is generally trimmed level. For coal carrying, the "Arch" principle of ship construction is good. It consists, virtually, in an alteration of form of the midship section. Up to the normal moulded depth, the structural arrangement is identical with usual construction, but at this depth, the upper structure is given the form of a transverse arch, the upper and lower abutments of which form the boundary of the horizontal and vertical span of flat structure of deck and sides. The vessel's depth, and consequently the depth of hold, is increased virtually by a 'tween deck height without increasing the vertical span of side plating. Also because of the greater freeboard to the weather deck, an inverse sheer becomes possible and a longitudinal inverse sheer is combined in the design with the transverse arch.

Coal, Ore, and Grain.

As with other forms of bulk transport, the carriage of coal on certain fixed routes with definite and constant supply and demand has produced vessels of the self-unloading type and vessels with specialized fittings. For example, colliers engaged in bringing coal from British north-east coast ports to the Thames-side gasworks have to pass under the bridges, and they are in consequence designed with hinging funnels and specially low superstructure. The ordinary ocean carrier of coal, on the other hand, must be very adaptable, since she may be required to carry grain for her next cargo, and then perhaps a general cargo. For this reason, we can label the ocean grain carrier, coal or ore carrier, a semi-special type of ship able to carry cargoes of either type as occasion demands. Grain in bulk more nearly approaches in characteristics a liquid cargo than any other bulk cargo, excluding of course oil, and for this reason a somewhat similar method of handling it and stowing on board ship

is adopted. It is loaded into the ship by means of chutes, down which it pours in liquid cascades, and it is unloaded by means of centrifugal pumps, which suck it from the hold, the pumps being contained in extraneous floating hulls which automatically weigh the cargo and discharge it into barges and sheds. Its "free surface" is broken up by means of steel centre line bulkheads worked fore and aft from each thwartship watertight hold bulkhead as far as the hatch openings, under which portable wooden bulkheads are arranged in vertical chocks. The special fittings are thus of a purely temporary nature and permit of the holds carrying any other bulk cargo, except oil, and also a package cargo if necessary. No bulk cargo vessel should, for convenience of stowing and handling, be of a structural type which has more than one tier of 'tween decks.

A. C. HARDY.

PROFILES OF BRITISH AND FOREIGN WARSHIPS AND MERCHANT SHIPS

[In order to facilitate identification, the ships are arranged in accordance with the number of funnels and masts, as these are the features most easily distinguished at a distance. The page indicated, in the case of warships, refers the reader to the table where full particulars of the ships will be found. All the profiles are drawn to the scale $\frac{1}{8}$ in. = 100 ft.]

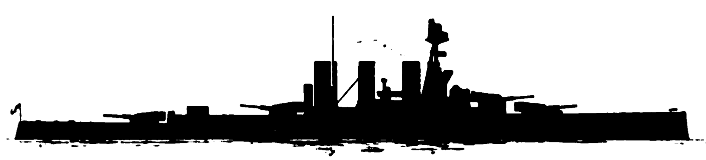
[Indexes to the names of vessels of which profiles are included in this section are given at the end of the volume.]

CAPITAL SHIPS.

[In order to facilitate identification, the ships are arranged in accordance with the number of funnels and masts, as these are the features most easily distinguished at a distance. The page indicated, in the case of warships, refers the reader to the table where full particulars of the ships will be found. All the profiles are drawn to the scale $\frac{1}{3}$ in. = 100 ft.]

[Indexes to the names of vessels of which profiles are included in this section are given at the end of the volume.]

FRANCE. Battleships. Condorcet, Diderot. (See p. 356.)



GREAT BRITAIN. Battle-cruiser. Tiger. (See p. 344.)

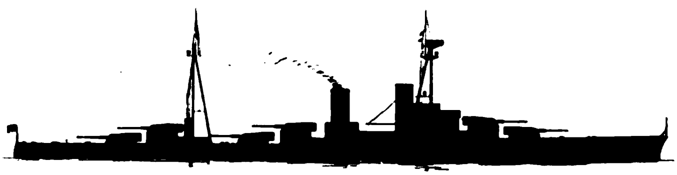
JAPAN. Battle-cruisers. Haruna, Hiyei, Kongo, Kirishima. (See pp. 364 and 365.)

FRANCE. Battleships. Courbet, Jean Bart, Paris. (See pp. 356 and 357.)

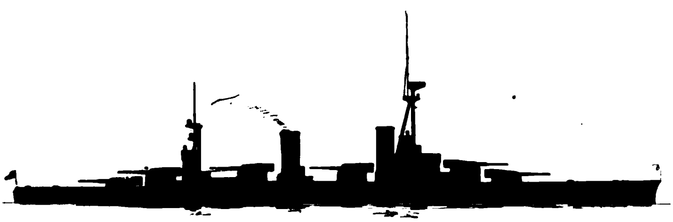
GREAT BRITAIN. Battle-cruiser. Hood. (See p. 342.)

GREAT BRITAIN. Battle-cruisers. Renown, Repulse. (See p. 343.)

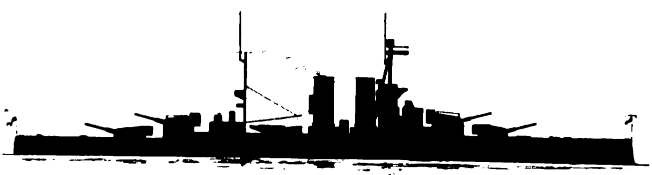
JAPAN. Battleships. Mutsu, Nagato. (See p. 365.)



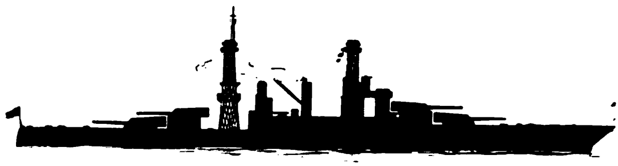
JAPAN. Battleships. Hyuga, Ise. (See p. 364.)



JAPAN. Battleships. Fuso, Yamashiro. (See pp. 364 and 365.)



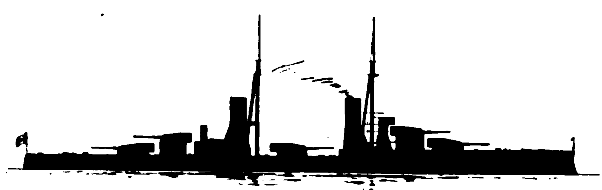
GREAT BRITAIN. Battleships. Barham, Malaya, Queen Elizabeth, Valiant, Warspite. (See pp. 342, 343, and 344.)



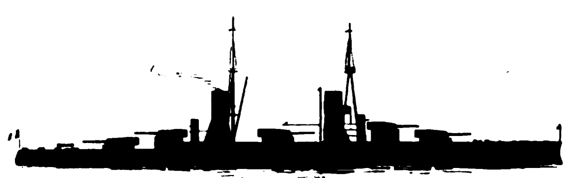
UNITED STATES. Battleships. California, Tennessee, Colorado, Maryland, West Virginia. (See pp. 374, 375, and 377.)

GREAT BRITAIN. Battleships. Benbow, Emperor of India, Iron Duke, Marlborough. (See pp. 342 and 343.)

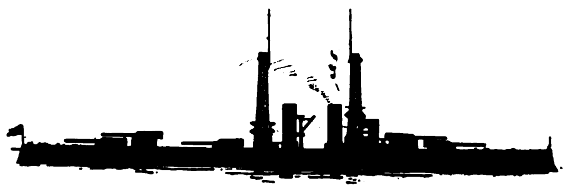
GREAT BRITAIN. Battleships. Centurion, King George V. (See p. 342.)



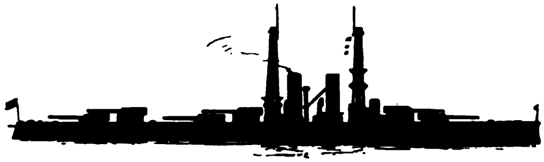
ITALY. Battleships. Andrea Doria, Caio Duilio. (See p. 361.)



ITALY. Battleships. Conte Di Cavour, Giulio Cesare. (See p. 361.)

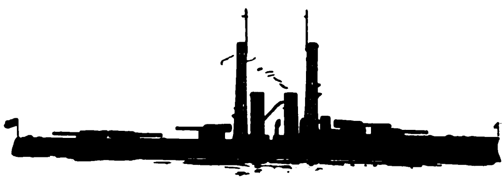


UNITED STATES. Battleships. New York, Texas. (See pp. 376 and 377.)



UNITED STATES. Battleships. Arkansas, Wyoming. (See pp. 374 and 377.)

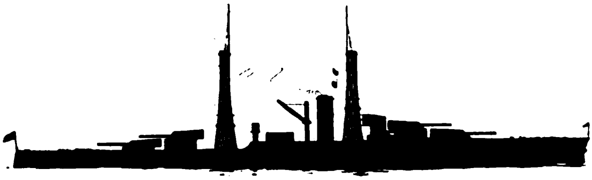
FRANCE. Battleships. Bretagne, Lorraine, Provence. (See pp. 356 and 357.)



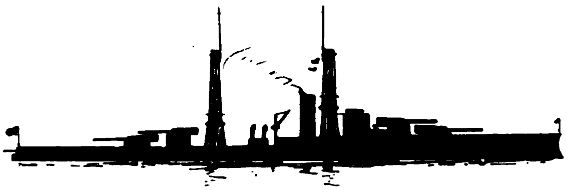
UNITED STATES. Battleships. Florida, Utah. (See pp. 375 and 377.)

GREAT BRITAIN. Battleships. Ramillies, Resolution, Revenge, Royal Oak, Royal Sovereign. (See p. 343.)

UNITED STATES. Battleships. Idaho, Mississippi, New Mexico. (See pp. 375 and 376.)

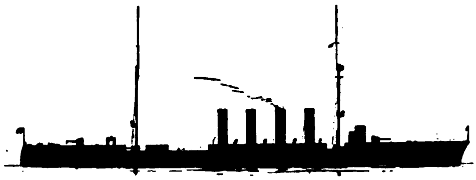


UNITED STATES. Battleships. Arizona, Pennsylvania. (See pp. 374 and 376.)

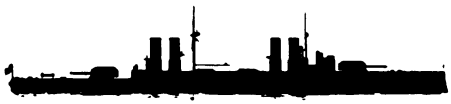


UNITED STATES. Battleships. Nevada, Oklahoma. (See p. 376.)

CRUISERS.



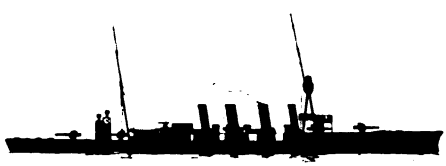
JAPAN. Cruisers Chikuma, Hirado, Yahagi. (See pp. 366 and 367)



ITALY. Cruisers. San Giorgio, San Marco. (See p. 361.)

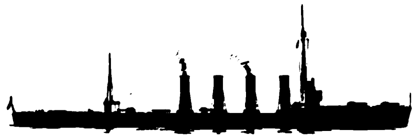
FRANCE. Light Cruiser. Mulhouse (*ex-German* Stralsund). (See p. 358.)

ITALY. Scout Cruisers. Marsala, Nino Bixio. (See pp. 362 and 363.)

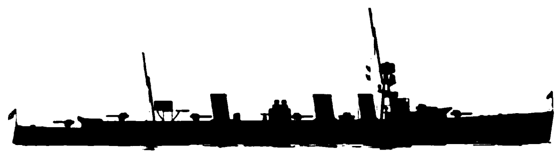


GREAT BRITAIN. Light Cruisers. Birmingham, Dublin, Lowestoft. Southampton. (See pp. 345, 348, and 349.)

ITALY. Light Cruiser. Taranto (*ex-German* Strassburg). (See p. 363.)



FRANCE. Light Cruiser. Thionville (*ex-Austrian* **Novara**). (See p. 358.)

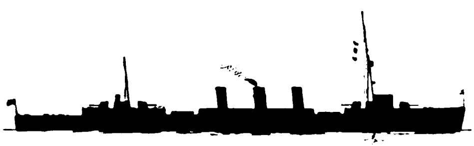


GREAT BRITAIN. Light Cruisers. Emerald, Enterprise. (See p. 348.)

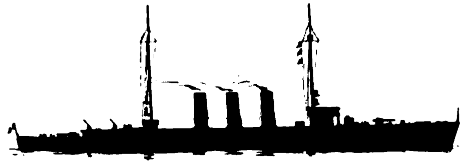
JAPAN. Light Cruisers. Kiso, Kitakami, Kuma, Oh-I, Tama.
*** Abukama, Isudzu, Jintsu, Kinu, Natori, Nagara, Sendai, Yura.**
(See pp. 366, 367.)

* Slightly different bridge to above. Has aircraft hangar incorporated in bridge structure.

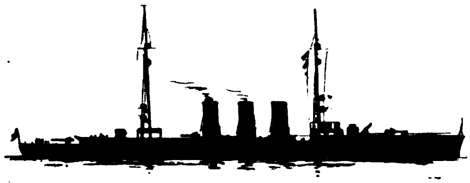
FRANCE. Light Cruiser. Metz (*ex-German* **Königsberg**). (See p. 358.)



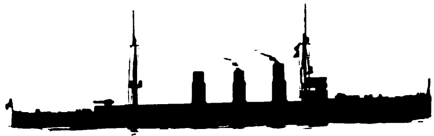
JAPAN. Light Cruisers. Tatsuta, Tenryu. (See p. 367.)



FRANCE. Light Cruiser. Strasbourg (*ex-German* **Regensburg**). (See p. 358.

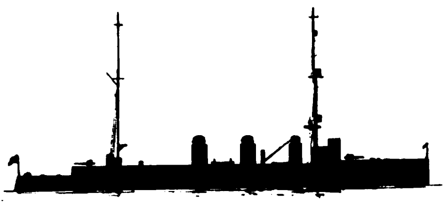


ITALY. Light Cruiser. Ancona (*ex-German* Graudenz). (See p. 362.)



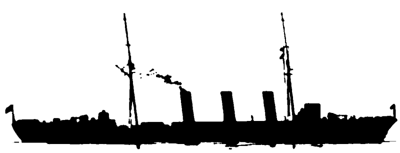
ITALY. Light Cruiser. Bari (*ex-German* Pillau). (See p. 362.)

GREAT BRITAIN. Light Cruiser. Cleopatra. (See p. 346.)

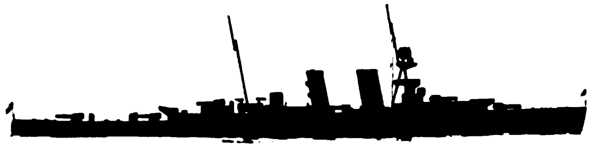


ITALY. Scout Cruiser. Quarto. (See p. 363.)

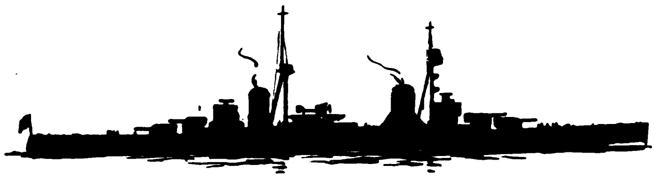
FRANCE. Light Cruiser. Colmar (*ex-German* Kolberg). (See p. 358.)



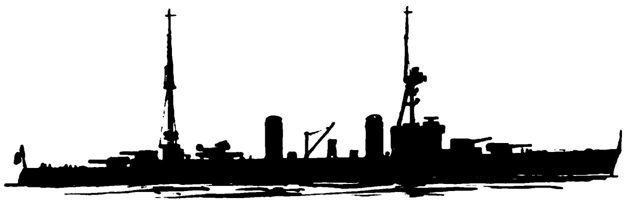
JAPAN. Second Class Cruiser. Tone. (See p. 367.)



GREAT BRITAIN. Light Cruisers. Effingham, Frobisher, Hawkins, Vindictive. (See pp. 348 and 349.)



ITALY. Cruisers. Trento, Trieste. (See p. 362.)



FRANCE. Cruisers. Duquesne, Tourville. (See p. 358.)

GREAT BRITAIN. Light Cruisers. Danae, Dauntless, Delhi, Dunedin, Dragon, Durban. (See pp. 347 and 348.)

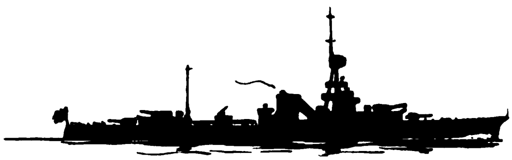
GREAT BRITAIN. Light Cruisers. Cardiff, Ceres, Coventry, Curacoa, Curlew. (See p. 347.)

GREAT BRITAIN. Light Cruisers. Cairo, Calcutta, Cape Town, Carlisle, Colombo. (See p. 346.)

GREAT BRITAIN. Light Cruisers. Caledon, Calypso, Caradoc. (See p. 346.)

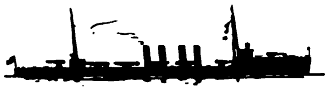
GREAT BRITAIN. Light Cruisers. Cambrian, Canterbury, Castor, Constance. (See p. 347.)

GREAT BRITAIN. Cruisers. Courageous, Glorious. (See p. 345.)
These vessels are being reconstructed as aircraft-carriers.



JAPAN. Light Cruiser. Yubari. (See p. 367.)

TORPEDO BOAT DESTROYERS.



UNITED STATES. Torpedo Boat Destroyers. Allen, Alywin, Conyngham. (See p. 401.)

UNITED STATES. Torpedo Boat Destroyer. Caldwell. (See p. 401.)

UNITED STATES. Torpedo Boat Destroyer. Clemson. (See p. 401.)

FRANCE. Torpedo Boat Destroyers. Algérien, Annamite, Arabe, Bambara, Hova, Kabyle, Marocain, Sakalave, Sénégalais, Somali, Tonkinois, Touareg. (See p. 391.)

FRANCE. Torpedo Boat Destroyers. Aventurier, Intrépide, Téméraire. (See p. 391.)

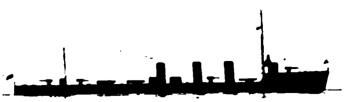
JAPAN. Torpedo Boat Destroyer. Kaba. (See p. 396.)

FRANCE. Torpedo Boat Destroyers. Enseigne Roux, Mécanicien Principal Lestin. (See p. 391.)

ITALY. Torpedo Boat Destroyers. Angelo Bassini, E. Cosenz, Francesco Stocco, Giacinto Carini, Giacoma Medici, Giovanni G. Acerbi, Giuseppe la Farina, Giuseppe la Masca, Giuseppe Sirtori, Nicola Fabrizi, Vincenzo G. Orsini. (See p. 394.)

FRANCE. Torpedo Boat Destroyers. Bouclier, Casque, Cimeterre. (See p. 391.)

ITALY. Torpedo Boat Destroyer. Carlo Mirabello. (See p. 362.)



JAPAN. Torpedo Boat Destroyer. Amatsukaze. (See p. 396.)

GREAT BRITAIN. Torpedo Boat Destroyer. Broke. (See p. 385.)

GREAT BRITAIN. Torpedo Boat Destroyers. Vansittart, Venomous, Verity, Volunteer, Wanderer, Whitehall, Whitshed, Wild Swan, Wishart, Witch, Wren. (See p. 386.)

GREAT BRITAIN. Torpedo Boat Destroyers. Vancouver, Vanessa, Vanity, Vanoc, Vanquisher, Vectis, Vega, Velox, Vendetta, Venetia, Venturous, Verdun, Versatile, Vesper, Vidette, Vimiera, Violent, Vivacious, Vivien, Vortigern. (See pp. 386 & 387.)

GREAT BRITAIN. Torpedo Boat Destroyers. Viceroy, Viscount, Voyager, Wakeful, Walker, Walpole, Walrus, Warwick, Watchman, Waterhen, Wessex, Westcott, Westminster, Whirlwind, Whitley, Winchelsea, Winchester, Wolfhound, Wolsey, Woolston, Wrestler, Wryneck. (See pp. 386 & 387.)

JAPAN. Torpedo Boat Destroyer. Momo. (See p. 396.)

ITALY. Torpedo Boat Destroyer. Quintino Sella. (See p. 394.)

ITALY. Torpedo Boat Destroyer. Alessandro Poerio. (See p. 394.)

ITALY. Torpedo Boat Destroyer. Nazario Sauro. (See p. 394.)

GREAT BRITAIN. Torpedo Boat Destroyers. Tower, Trenchant, Ulster, Umpire, Undine, Urchin, Ursa, Ursula. (See p. 388.)

GREAT BRITAIN. Torpedo Boat Destroyers. Shikari, Simoom, Tasmania, Tattoo. (See pp. 350, 385, & 386.)

ITALY. Torpedo Boat Destroyer. Palestro. (See p. 394.)

ITALY. Torpedo Boat Destroyer. Turbine. (See p. 394.)

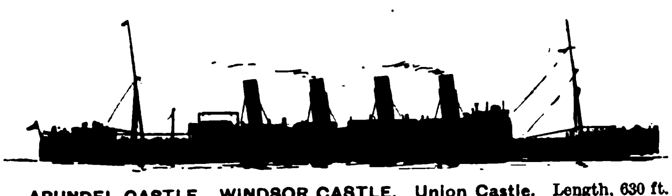
MERCHANT SHIPS.

AQUITANIA. Cunard. Length, 868 ft. 7 ins. ; Gross Tonnage, 45,847l;
Funnels : Red, Black Tops.

OLYMPIC. White Star. Length, 852 ft. 5 ins. ; Gross Tonnage, 46,439 ;
Funnels : Buff, Black Tops.

MAURETANIA. Cunard. Length, 762 ft. 2 ins. ; Gross Tonnage, 30,696 ;
Funnels : Red, Black Tops.

FRANCE. Cie. Générale Transatlantique. Length, 689 ft. 2 ins. ; Gross Tonnage, 23,666 ;
Funnels : Red, Black Tops.



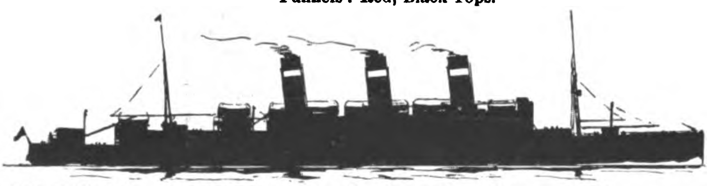
ARUNDEL CASTLE. WINDSOR CASTLE. Union Castle. Length, 630 ft. 5 ins. ; Gross Tonnage, 18,980 ;
Funnels : Red, Black Tops.

MAJESTIC. White Star. Length, 915 ft. 5 ins.; Gross Tonnage, 56,551; Funnels: Buff, Black Tops.

LEVIATHAN. United States Shipping Board. Length, 907 ft.; Gross Tonnage, 59,957; Funnels: Red, White Band, Blue Tops.

BERENGARIA. Cunard. Length, 883 ft. 6 ins.; Gross Tonnage, 52,226; Funnels: Red, Black Tops.

PARIS. Cie. Générale Transatlantique. Length, 735 ft. 4 ins.; Gross Tonnage, 34,569; Funnels: Red, Black Tops.



BELGENLAND. Red Star Line. Length, 697 ft.; Gross Tonnage, 27,132; Funnels: Black, White Band.

CAP POLONIO. Hamburg South Amerika. Length, 637·7 ft.; Gross Tonnage, 20,576; Funnels: White, Red Tops.

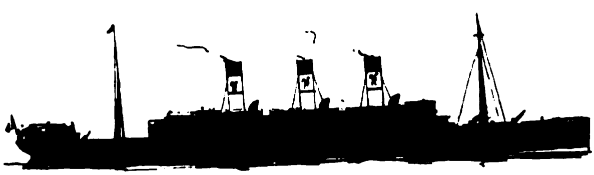
EMPRESS OF CANADA. Canadian Pacific. Length, 627 ft.; Gross Tonnage, 21,517; Funnels: Yellow.

RELIANCE. American Mail Corporation. Length, 592 ft.; Gross Tonnage, 16,798. Funnels: Yellow, Two Blue Bands.

EMPRESS OF AUSTRALIA. Canadian Pacific. Length, 589 ft. 8 ins.; Gross Tonnage, 21,861 Funnels: Yellow.

NALDERA. Peninsular and Oriental. Length, 580 ft. 9 ins.; Gross Tonnage, 15,825;
NARKUNDA. ,, ,, ,, Length, 581 ft. 4 ins.; Gross Tonnage, 16,118;
Funnels: Black.

MASSILIA. Cie. Sud Atlantique. Length, 579 ft.; Gross Tonnage, 15,147 Funnels: Buff, Black Tops. Cockerel on sides.



LUTETIA. Cie. Sud Atlantique. Length, 579 ft.; Gross Tonnage, 14,654; Funnels: Buff, Black Tops. Cockerel on side.

EMPRESS OF ASIA. EMPRESS OF RUSSIA. Canadian Pacific.
Length, 570 ft. 1 in.; Gross Tonnage, 16,909;
Funnels: Yellow.

TRANSYLVANIA. CALEDONIA. Anchor Henderson.
Length 550 ft; Gross Tonnage, 17,000.
Funnels: Black.

CHAMPOLLION. Messageries Maritimes.
Length, 508 ft. 6 ins.; Gross Tonnage 12,500.
Funnels: Black.

TAIREA. TAKLIWA. TALAMBA. British India S.N. Co.
Length, 449 ft. 6 ins.; Gross Tonnage, 8,000;
Funnels: Black, Two White Bands, Black Top.

PRINCESS KATHLEEN. PRINCESS MARGUERITA. Canadian Pacific.
Length, 350 ft.; Gross Tonnage, 6,000;
Funnels: Yellow.

CIUDAD DE BUENOS AIRES. Argentine S.N. Co. CIUDAD DE MONTE VIDEO. Uruguayan S.N. Co. Length, 350 ft.; Gross Tonnage, 3,864;
Funnels: Yellow, Black Tops.

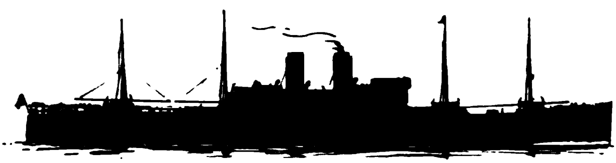
ADRIATIC. White Star. Length, 709 ft. 2 ins.; Gross Tonnage, 24,541; Funnels: Buff, Black Tops.

GEORGE WASHINGTON. United States Shipping Board. Length 699 ft.; Gross Tonnage 23,788; Funnels: Red, White Band, Blue Top. U.S.A. shield on side.

CEDRIC. CELTIC. White Star. Length, 680 ft. 9 ins.; Gross Tonnage, 21,073; Funnels: Buff, Black Tops.

EMPRESS OF SCOTLAND. Canadian Pacific. Length, 677 ft.; Gross Tonnage, 25,128; Funnels: Yellow.

LAPLAND. Red Star Line. Length, 605 ft.; Gross Tonnage, 18,565; Funnels: Black, White Band.



ALBERT BALLIN. DEUTSCHLAND. Hamburg Amerika Line. Length, 602 ft 6 ins.; Gross Tonnage, 20,815; Funnels: Yellow.

FINLAND. KROONLAND. International Mercantile Marine Co. Length, 560 ft.; Gross Tonnage, 12,230; Funnels: Black, White Band.

LATVIA. Det Ostasiatiske Kompagnie Akties. Length, 475 ft.; Gross Tonnage, 8,332; Funnels: Yellow.

HOMERIC. White Star. Length, 751 ft.; Gross Tonnage, 34,351; Funnels: Buff, Black Tops.

ORAMA. ORONSAY. OTRANTO. Orient. Length, 658 ft.; Gross Tonnage, 20,000; Funnels: Cream.

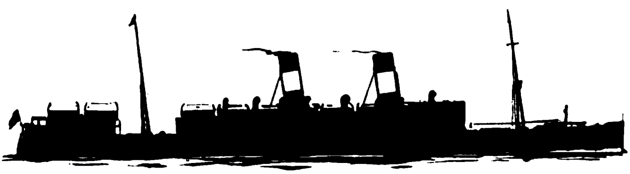
ASTURIAS. M.V. Royal Mail Steam Packet Co. Length, b.p., 655 ft. 8 ins.; Gross Tonnage, 22,000 tons. Funnels: Buff.

CONTE BIANCANAMO. Lloyd Sabaudo. Length, 655 ft.; Gross Tonnage 23,000. Funnels: Yellow, white band between two narrow green.

CARONIA. **Cunard.** Length, 650 ft. : Gross Tonnage, 19,687 ; Funnels : Red, Black Tops.

ROTTERDAM. **Holland Amerika.** Length, 650 ft. ; Gross Tonnage, 24,149 ; Funnels : Buff, Two Blue Bands with White Band between, Buff Top.

CARNARVON CASTLE. **Union Castle Line.** Length, 629 ft. ; Tonnage, 22,000 ; Funnel : Red, Black Top.



GIULIO CESARE. **Navigazione Generale Italiana.** Length, 626 ft. ; Gross Tonnage, 21,657 ; Funnels : Black, Broad White Band.

MOOLTAN. **MALOJA.** **Peninsular and Oriental.** Length, 625 ft. ; Gross Tonnage, 20,847 ; Funnels : Black.

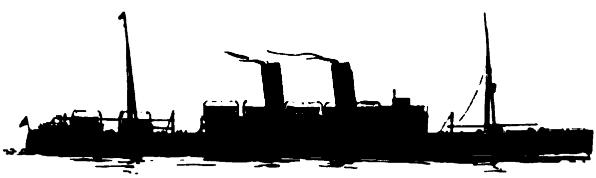
REGINA. **White Star—Leyland Line.** Length, 600 ft. ; Gross Tonnage, 16,500 ; Funnels : White Star Colours, Buff, Black Tops.

MONTNAIRN. Canadian Pacific. Length, 590 ft.; Gross Tonnage, 16,992
Funnels: Yellow.

OHIO. Royal Mail Steam Packet Co. Length, 588 ft. 8 ins.; Gross Tonnage, 18,000;
Funnels: Buff.

ORMONDE. Orient. Length, 580 ft. 5 ins.; Gross Tonnage, 14,853;
Funnels: Cream.

M.S. AORANGI. Union Steamship Co. of N.Z. Length, 580 ft.; Gross Tonnage, 17,500;
Funnels: Red, Black Tops.



VEENDAM. VOLENDAM. Holland America Line. Length, 576 ft.; Gross Tonnage, 15,434;
Funnels: Buff, White Band between Two Green.

SAXON. Union Castle. Length, 570 ft. 5 ins.; Gross Tonnage, 12,385;
Funnels: Red, Black Tops.

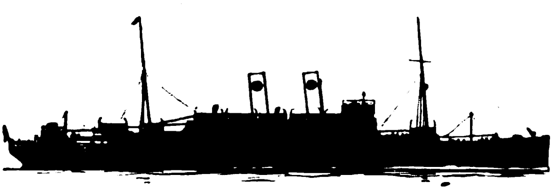
CONTE ROSSO. CONTE VERDE. Lloyd Sabaudo. Length, 570 ft. 2 ins.; Gross Tonnage, 17,048; Funnels: Yellow, White Band between Two Narrow Green.

ARMADALE CASTLE. Union Castle. Length, 570 ft. 1 in.; Gross Tonnage, 12,973; Funnels: Red, Black Tops.

BALMORAL CASTLE. EDINBURGH CASTLE. Union Castle. Length, 520 ft.; Gross Tonnage, 13,361; Funnels: Red, Black Tops.

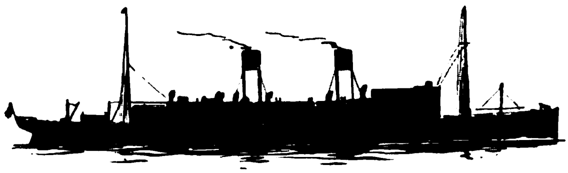
ROCHAMBEAU. Cie. Générale Transatlantique. Length, 559 ft.; Gross Tonnage, 17,400; Funnels: Red, Black Tops.

ORMUZ. Orient. Length, 550 ft.; Gross Tonnage, 14,588; Funnels: Cream.



M.S. GRIPSHOLM. Swedish American Line. Length 550 ft.; Gross Tonnage, 17,000. Funnels: Yellow, Blue Discs on Sides.

DE GRASSE. Cie. Générale Transatlantique. Length, 550 ft.; Gross Tonnage, 17,000; Funnels: Red, Black Tops.



TENYO MARU. SHINYO MARU. Toyo Kisen Kaisha. Length 550 ft.; Gross Tonnage, 13,400. Funnels: Yellow, Black Top.

MONTCALM. MONTCLARE. MONTROSE. Canadian Pacific. Length, 549 ft. 5 ins.; Gross Tonnage, 16,418; Funnels: Yellow.

MONTROYAL. Canadian Pacific. Length, 548 ft. 8 ins.; Gross Tonnage, 15,857; Funnels: Yellow.

RAJPUTANA. RANCHI. RAWALPINDI. Peninsular and Oriental. Length, 547 ft.; Gross Tonnage, 16,100; Funnels: Black.

ARAMIS. D'ARTAGNAN. Messageries Maritimes. Length, 541 ft.; Gross Tonnage, 13,950. Funnels: Black.

MALWA. MANTUA. MOREA. Peninsular and Oriental. Length, 540 ft.; Gross Tonnage, 10,941; Funnels: Black.

GELRIA. Koninklijke Hollandsche Lloyd. Length, 540 ft.; Gross Tonnage, 13,868; Funnels: Yellow, Black Band.

ORSOVA. Orient. Length, 536 ft. 2 ins.; Gross Tonnage, 13,036; Funnels: Cream.

ORVIETO. Orient. Length, 535 ft. 3 ins.; Gross Tonnage, 12,133; Funnels: Cream.

OSTERLEY. Orient. Length, 535 ft.; Gross Tonnage, 12,129; Funnels: Cream.

STAVANGERFJORD. Norske Amerikalinje. Length, 532 ft. Gross Tonnage, 12,077; Funnels: Yellow, Two Red and Two White Bands with Blue Band between.

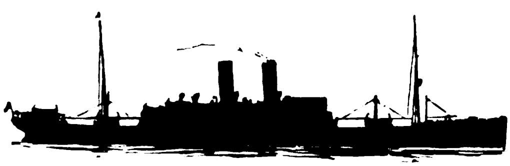
VASCO NUNEZ DE BALBOA. Compañia Trasatlantica. Length, 531 ft.; Gross Tonnage, 7,842; Funnels: Black.

MACEDONIA. Peninsular and Oriental. Length, 530 ft. 4 ins.; Gross Tonnage, 11,089; Funnels: Black.

ANDRE LEBON. Messageries Maritimes. Length 528 ft.; Gross Tonnage, 13,681; Funnels: Black.

CATHAY. CHITRAL. COMORIN. Peninsular and Oriental. Length, 525 ft.; Gross Tonnage, 15,000; Funnels: Black.

NIAGARA. Union Steam Ship Co. of N.Z. Length, 524 ft. 7 ins.; Gross Tonnage, 13,415, Funnels: Red, Black Tops.



FREDERIK VIII. Det Forenede Damskibs Setskab. Length, 523 ft.; Gross Tonnage, 11,850; Funnels: Black, Red Band.

KAISER-I-HIND. **Peninsular and Oriental.** Length, 520 ft. ; Gross Tonnage, 11,430 ;
Funnels : Black.

MINNEDOSA. **Canadian Pacific.** Length, 520 ft. ; Gross Tonnage, 14.000 ;
Funnels : Yellow.

BERGENSFJORD. **Norske Amerikalinje.** Length, 512 ft. ; Gross Tonnage, 10,709 ;
Funnels : Yellow, Two Red and Two White Bands with Blue Band between.

H. F. ALEXANDER. **Admiral Line.** Length, 509 ft. Gross Tonnage, 8,255 ;
Funnels : Tan, Black Top, White Disc with Flag.

CHICAGO. **Cie. Générale Transatlantique.** Length, 508 ft. ; Gross Tonnage, 14,250 ;
Funnels : Red, Black Tops.

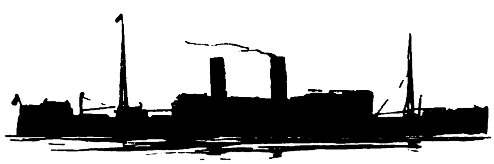
PAUL LECAT. **Messageries Maritimes.** Length, 508 ft. ; Gross Tonnage, 12,988 ;
Funnels : Black.

METAGAMA. Canadian Pacific. Length, 500 ft. 4 ins.; Gross Tonnage, 12,420; Funnels: Yellow.

RASMAK. Peninsular and Oriental. Length, 500 ft.; Gross Tonnage, 10,000; Funnels: Black.

CHINA. Peninsular and Oriental. Length, 500 ft. 5 ins.; Gross Tonnage, 7,952: Funnels: Black.

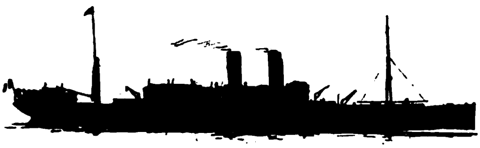
ALFONSO XII. Compañia Trasatlantica. Length, 481 ft. 4 ins.; Gross Tonnage, 6,743; Funnels: Black.



PATRIA. Wm. Ruys & Zonen. Length, 480 ft.; Gross Tonnage 9,891. Funnels: Black.

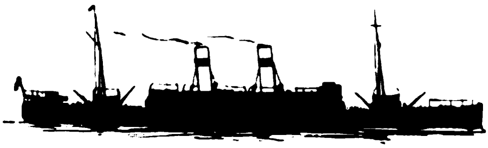
SPHINX. Messageries Maritimes. Length, 479 ft.; Gross Tonnage, 11,374; Funnels: Black.

PRESIDENTE WILSON. Cosulich Line. Length, 477 ft. 5 ins.; Gross Tonnage, 12,578; Funnels: Red, White Band, Black Top.



PORTHOS. Messageries Maritimes. Length, 476 ft.; Gross Tonnage, 12,691; Funnels: Black.

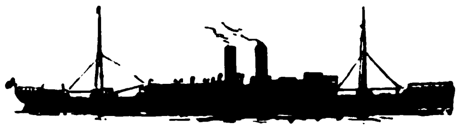
CUBA. Cie. Générale Transatlantique. Length, 476 ft.; Gross Tonnage, 11,400; Funnels: Red, Black Tops.



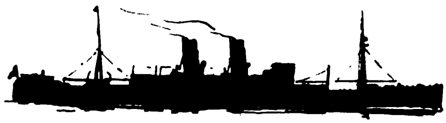
FLANDRIA. ORANIA. Koningen Hollandsche Lloyd. Length, 470 ft.; Gross Tonnage, 9,673; Funnels: Yellow, Black Band

MARTHA WASHINGTON. Cosulich Line. Length, 459 ft.; Gross Tonnage, 8,347; Funnels: Red, White Band, Black Top.

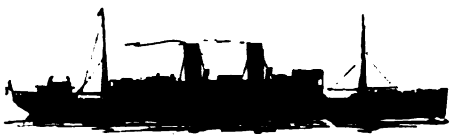
M.S. TALMA. TILAWA. British India S.N. Co. Length, 450 ft.; Gross Tonnage, 10,000. Funnels: Black, Two White Bands, Black Top.



PEROU. Cie. Générale Transatlantique. Length, 449 ft.; Gross Tonnage, 6,600; Funnels: Red, Black Tops.



DE LA SALLE. Cie. Générale Transatlantique. Length, 440 ft.; Gross Tonnage, 7,500; Funnels: Red, Black Tops.



ASIE. Chargeurs Reunis. Length, 439 ft.; Gross Tonnage, 9,059; Funnels: Yellow, Red Stars on White Band.

HAYTI. Cie. Générale Transatlantique. Length, 410 ft.; Gross Tonnage, 6,179; Funnels: Red, Black Tops.

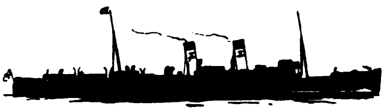
M.S. RIO BRAVO. RIO PANUCO. Flensburger Dampfer Co. (H. Schuldt). Length, 410 feet; Gross Tonnage, 6,000; Funnels: Black, Blue Band, White Diamond with Red S.

NAGASAKA MARU. SHANGHAI MARU. Nippon Yusen Kaisha. Length, 402 ft.; Gross Tonnage, 5,272; Funnels: Black.

ARANKOLA. British India S.N. Co. Length, 390 ft. 3 ins.; Gross Tonnage, 4,129; Funnels: Black, Two White Bands, Black Tops.

ANGLIA. CAMBRIA. HIBERNIA. SCOTIA. **London, Midland and Scottish Railway.**
Length, 380 ft. 5 ins. ; Gross Tonnage, 3,460 ;
Funnels : Yellow, Black Tops.

WAHINE. **Union Steam Ship Co. of N.Z.** Length, 375 ft. ; Gross Tonnage, 4,436 ;
Funnels : Red, Black Tops.



KEIFUKU MARU. SHOKEI MARU. TOKUJU MARU. **Imperial Japanese Railway.**
Length, 375 ft. ; Gross Tonnage, 5,857 :
Funnels : Yellow, Black Top, Red I on Yellow.

GOUVERNEUR GENERAL CHANZY. **French Government.** Length, 361 ft. ;
Gross Tonnage, 4,500.

ST. ANDREW. ST. DAVID. ST. PATRICK. **Great Western Railway.**
Length, 351 ft. 1 in. ; Gross Tonnage, 2,495 ;
Funnels : Red, Black Tops.

MENEVIA. **London, Midland and Scottish Railway.** Length, 329 ft. ;
Gross Tonnage, 1,872 ;
Funnels : Yellow, Black Tops.

ANTWERP. MALINES. **London and North Eastern Railway.** Length, 321 ft. 6 ins. ;
Gross Tonnage, 2,957 ;
Funnels : Yellow, Black Tops.

CURRAGHMORE. London, Midland and Scottish Railway. Length, 307 ft 1 in. ;
Gross Tonnage, 1,587 ;
Funnels : Yellow, Black Tops.

GREENORE. London, Midland and Scottish Railway. Length, 306 ft ;
Gross Tonnage, 1,488 ;
Funnels : Yellow, Black Tops.

RATHMORE. London, Midland and Scottish Railway. Length, 299 ft. 5 ins ;
Gross Tonnage, 1,569 ;
Funnels : Yellow, Black Tops.

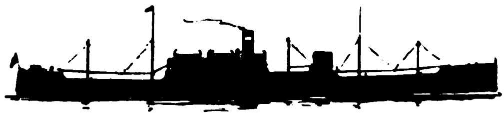
ST. HELIER. ST. JULIEN. Great Western Railway. Length, 290 ft. ;
Gross Tonnage, 2,000 ;
Funnels : Red, Black Top.

HANTONIA. NORMANNIA. Southern Railway. Length, 290 ft. 3 ins ;
Gross Tonnage, 1,567 ;
Funnels : Buff.

REINDEER. Great Western Railway. Length, 280 ft. ; Gross Tonnage, 1,101 ;
Funnels : Red, Black Tops.

DIEPPE. Southern Railway. Length, 273 ft. 5 ins ; Gross Tonnage, 1,228 ;
Funnels : White, Black Tops.

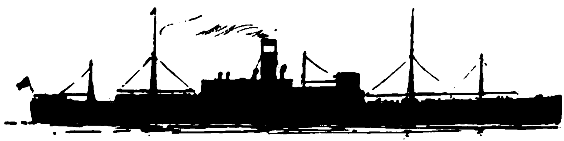
ROTORUA. New Zealand Shipping Co. Length, 526 ft. 6 ins. ; Gross Tonnage, 12,184 ;
Funnel : Buff.



PRESIDENT ADAMS. **Dollar Steamship Line.** Length, 502 ft.; Gross Tonnage, 10,558;
PRESIDENT GARFIELD. ,, ,, ,, ,, ,, 10,558;
PRESIDENT HARRISON. ,, ,, ,, ,, ,, 10,533;
PRESIDENT HAYES. ,, ,, ,, ,, ,, 10,533;
PRESIDENT MONROE. ,, ,, ,, ,, ,, 10,533;
PRESIDENT POLK. ,, ,, ,, ,, ,, 10,533;
PRESIDENT VANBUREN. ,, ,, ,, ,, ,, 10,533;
Funnel: Black, White $ on Red Band.

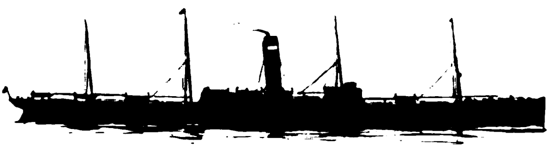
BARONESA. **Furness (Houlder).** Length, 431 ft.: Gross Tonnage, 3,663.
Funnel: Black, Red Band, White Maltese Cross, Black Top.

NIEUW AMSTERDAM. **Holland Amerika.** Length, 615 ft.; Gross Tonnage, 17,149;
Funnel: Buff, White Band between Two Green.



PRESIDENT ROOSEVELT. **United States Shipping Board.** Length, 535 ft.; Gross Tonnage, 14,127;
Funnel: Red, White Band, Blue Top, U.S.A. Shield on side.

PRESIDENT LINCOLN. PRESIDENT CLEVELAND. PRESIDENT PIERCE. PRESIDENT TAFT. PRESIDENT WILSON. Dollar Steamship Line.
Funnel: Black, White $ on Red Band.



HAVERFORD. **Internation Mercantile Marine Co.** Length, 531 ft.; Gross Tonnage, 11,635;
Funnel: Black, White White Band.

ATHENIC. **Shaw, Savill, and Albion Co.** Length, 500 ft. 8 ins.; Gross Tonnage, 12,366;
Funnel: Buff, Black Top.

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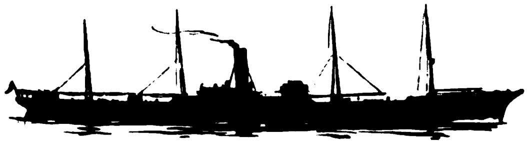


COLONIA. **Telegraph Construction and Maintenance Co.** Length, 487 ft.; Gross Tonnage, 8,010; Funnel: Yellow.

YORKSHIRE. **Bibby Line.** Length, 482 ft. 4 ins.; Gross Tonnage, 10,250; Funnel: Salmon Pink, Black Top.

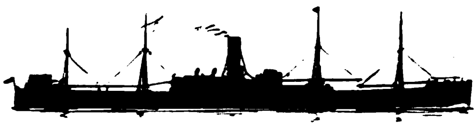
LANCASHIRE. **Bibby Line.** Length, 482 ft. 4 ins.; Gross Tonnage, 9,445, Funnel: Salmon Pink, Black Top.

DIPLOMAT. **Harrison Line.** Length, 482 ft.; Gross Tonnage, 8,218; Funnel: Black, Red Band between Two White.

MENOMINEE. **Atlantic Transport.** Length, 475 ft.; Gross Tonnage, 6,919; Funnel: Red, Black Top.

OXFORDSHIRE. **Bibby Line.** Length, 474 ft. 7 ins.; Gross Tonnage, 8,624; Funnel: Salmon Pink, Black Top.

WARWICKSHIRE. **Bibby Line.** Length, 470 ft. 3 ins.; Gross Tonnage, 8,012; Funnel: Salmon Pink, Black Top.



LEITRIM. **Union Steam Ship Co. of N.Z.** Length, 470 ft.; Gross Tonnage, 9,540; Funnel: Red, Black Top.

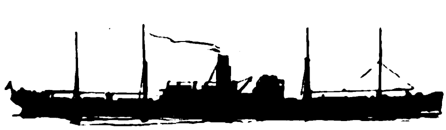
GLOUCESTERSHIRE. **Bibby Line.** Length, 467 ft. 2 ins.; Gross Tonnage, 8,124; Funnel: Salmon Pink, Black Top.

LEICESTERSHIRE. **Bibby Line.** Length, 467 ft. 2 ins.; Gross Tonnage, 8,059; Funnel: Salmon Pink, Black Top.

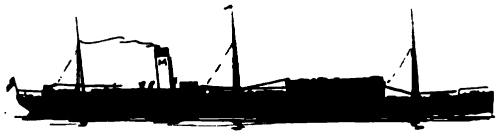
COLLEGIAN. **Harrison Line.** Length, 455 ft.; Gross Tonnage, 5,850; Funnel: Black, Red Band between Two White.

HEREFORDSHIRE. **Bibby Line.** Length 452 ft. 3 ins.; Gross Tonnage, 7,192; Funnel: Salmon Pink, Black Top.

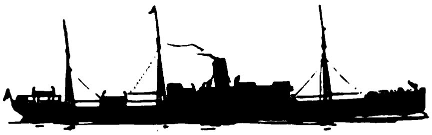
DERBYSHIRE. **Bibby Line.** Length, 452 ft.; Gross Tonnage, 6,776; Funnel: Salmon Pink, Black Top.



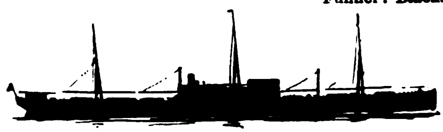
HYACINTHUS. HYPATIA. **Houston Line.** Length, 452 ft.; Gross Tonnage, 5,725; Funnel: Red, Black Top, Two Black Bands.



MAUI. **Matson Navigation Co.** Length 484 ft. ; Gross Tonnage, 9,801 ;
Funnel : Yellow, Black Top, with "M."

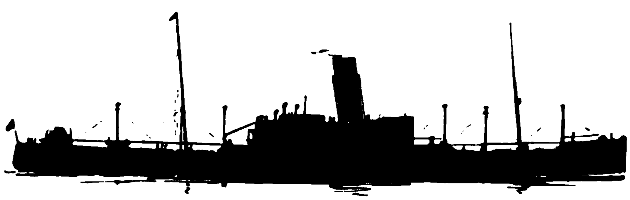


MANUEL CALVO. **Compañia Trasatlantica.** Length 435 ft. ; Gross Tonnage, 5,617 ;
Funnel : Black.



M.S. BALBOA. **BUENOS AIRES.** **CANADA.** **Axel Axelson Johnson.**
Length, 426 ft. ; Gross Tonnage, 5,455.

MONTEVIDEO. **Compañia Trasatlantica.** Length, 422 ft. ; Gross Tonnage, 5,205 ;
Funnel : Black.



MINNETONKA. **MINNEWASKA.** **Atlantic Transport.** Length, 626 ft. ;
Gross Tonnage, 21,998 ;
Funnel : Red, Black Top.

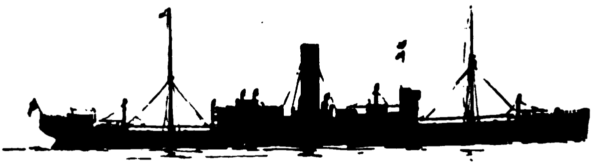
CARINTHIA. **FRANCONIA.** **Cunard.** Length, 600 ft. ; Gross Tonnage, 20,158 ;
Funnel : Red, Black Top.

LACONIA. **SAMARIA.** **SCYTHIA.** **Cunard.** Length, 600 ft. ; Gross
Tonnage, 20,158 ;
Funnels : Red, Black Top.

LANCASTRIA. Cunard. Length, 578 ft. ; Gross Tonnage, 16,700 ;
Funnel : Red, Black Top.

CAMERONIA. Anchor Henderson. Length, 552 ft. 5 ins. ; Gross Tonnage, 16,280 ;
Funnel : Black.

EURIPIDES. Aberdeen Line. Length, 570 ft. ; Gross Tonnage, 15,000 ;
Funnel : Ochre.



NESTOR. ULYSSES. Blue Funnel Line. Length, 563 ft. 2 ins. ; Gross Tonnago, 14,547 ;
Funnel : Blue, Black Top.

NOORDAM. RIJNDAM. Holland Amerika. Length, 560 ft. ; Gross Tonnage, 12,529 ;
Funnel : Buff, White Band between Two Green.

MEGANTIC. White Star. Length, 550 ft. 4 ins. ; Gross Tonnage, 14,878 ,
Funnel : Buff, Black Top.

ALMANZORA. Royal Mail Steam Packet Co. Length, 550 ft. 3 ins. ; Gross Tonnage, 16,034 ;
Funnel : Buff.

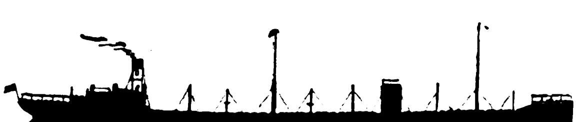
ORDUNA. Royal Mail Steam Packet Co. Length, 550 ft. 8 ins. ; Gross Tonnage, 15,499 ;
Funnel : Buff.

ORBITA. Royal Mail Steam Packet Co. Length, 550 ft. 3 ins. ; Gross Tonnage, 15,486 ;
Funnel : Buff.

ORCA. Royal Mail Steam Packet Co. Length, 550 ft. ; Gross Tonnage, 16,063 ;
Funnel : Buff.

CALIFORNIA. TUSCANIA. Anchor Henderson. Length, 550 ft. ; Gross Tonnage, 17,250 ;
Funnel : Black.

MOLDAVIA. MONGOLIA. Peninsular and Oriental. Length, 550 ft. ;
Gross Tonnage, 15,800 ;
Funnel : Black.

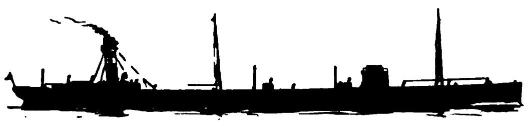


BETHORE. Ore Steamship Co., N.Y. Length, 550 ft. ; Gross Tonnage, 14,899 ;
Funnel : Grey, Blue and White Bands, White O.

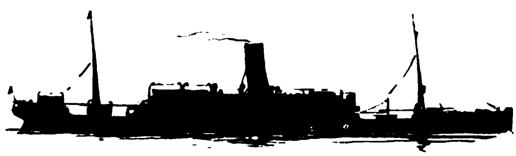
ESPERANCE BAY. HOBSONS BAY. JERVIS BAY. LARGS BAY. MORETON BAY.
Australian Commonwealth Line. Length, 548 ft.; Gross Tonnage, 16,500;
Funnels: Yellow.

OROYA. Pacific Steam Navigation Co. Length, 547 ft.; Gross Tonnage, 14,000;
Funnel: Buff.

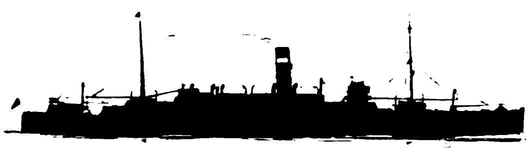
OROPESA. Pacific Steam Navigation Co. Length, 530 ft.; Gross Tonnage, 14,072;
Funnel: Buff.



SAN FRATERNO. SAN GREGORIO. SAN JERONIMO. SAN LORENZO. SAN MELITO.
SAN NAZARIO. SAN PATRICIO. Eagle Oil Transport Co.
Length, 527 ft. 3 ins.; Gross Tonnage, 11,929;
Funnel: Black, Yellow Band, Black Eagle, Black O on White Band, Yellow Band.



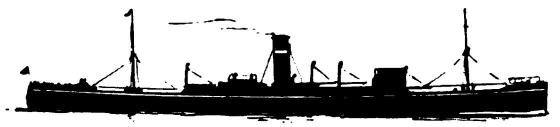
MARLOCH. Canadian Pacific. Length, 520 ft.; Gross Tonnage, 10,600;
Funnel: Yellow.



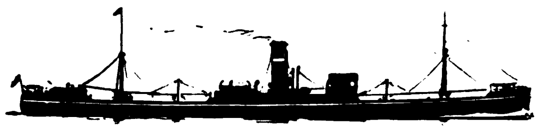
ATHENIA. LETITIA. Anchor (Donaldson). Length, 520 ft.; Gross Tonnage, 12,000;
Funnel: Black, White Band, Black Top.

BARADINE. **Peninsular and Oriental.** Length, 519 ft. 9 ins.; Gross Tonnage, 13,300; Funnel: Black.

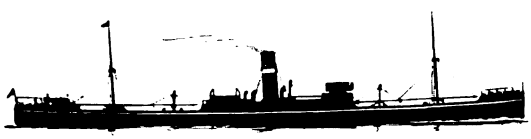
DIOGENES. SOPHOCLES. **Aberdeen Line.** Length, 518 ft.; Gross Tonnage, 12,500; Funnel: Ochre.



MANGALORE. MATHURA. **Anchor Brocklebank.** Length, 518 ft. Gross Tonnage, 9,751; Funnel: Black, White Band, Blue and White Stripe Band, Black Top.

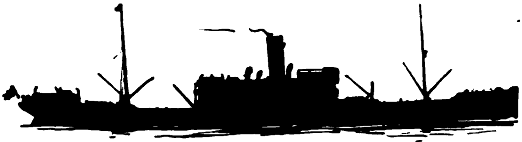


MALANCHA. **Anchor Brocklebank.** Length, 518 ft.; Gross Tonnage, 10,572; Funnel: Black, White Band, Blue and White Stripe Band, Black Top.



MACHARDA. **Anchor Brocklebank.** Length, 518 ft.; Gross Tonnage, 10,464; Funnel: Black, White Band, Blue and White Stripe Band, Black Top.

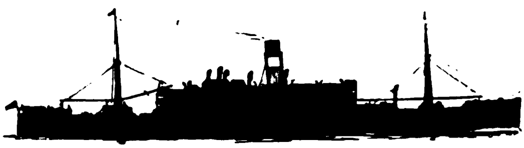
DROTTNINGHOLM. **Sverige-Norde-Amerika.** Length, 517 ft.; Gross Tonnage, 12,522; Funnel: Yellow, Blue Disc, Three Gold Crowns.



FUSHIMI MARU. SUWA MARU. Nippon Yusen Kaisha. Length, 516 ft.; Gross Tonnage, 10,938; Funnel: Black.

ARAQUAYA. Royal Mail Steam Packet Co. Length, 515 ft. 2 ins.; Gross Tonnage, 10,530; Funnel: Buff.

ORCOMA. Pacific Steam Navigation Co. Length, 511 ft. 7 ins.; Gross Tonnage, 11,571; Funnel: Buff.



VANDYCK. VOLTAIRE. Lamport and Holt. Length, 510 ft.; Gross Tonnage, 13,233; Funnel: Blue, White Band, Black Top.

ACHILLES. PHILOCTETES. TYNDAREUS. Blue Funnel Line. Length, 507 ft.; Gross Tonnage, 11,426; Funnel: Blue, Black Top.

DEMOSTHENES. THEMISTOCLES. Aberdeen Line. Length, 506 ft. 6 ins.; Gross Tonnage, 11,223; Funnel: Ochre.

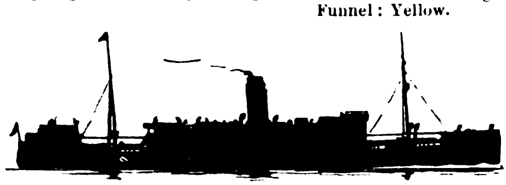
PORT MELBOURNE. PORT NAPIER. PORT SYDNEY. Commonwealth and Dominion Line. Length, 501 ft. 3 ins. ; Gross Tonnage, 9,152 ; Funnel : Red, Black Top.

DARRO. DEMERARA. DESEADO. DESNA. Royal Mail Steam Packet Co. Length, 500 ft. 7 ins. ; Gross Tonnage, 11,477 ; Funnel : Buff.

LLANSTEPHAN CASTLE. Union Castle Line. Length, 500 ft. 5 ins. ; Gross Tonnage, 11,293 ; Funnel : Red, Black Top.

BELTANA. BENALLA. BERRIMA. BORDA. Peninsular and Oriental. Length, 500 ft. ; Gross Tonnage, 11,120 ; Funnel : Black.

FORDSDALE. Australian Commonwealth Line. Length, 500 ft. ; Gross Tonnage, 9,674 ; Funnel : Yellow.



ALFONSO XIII. CRISTOBOL COLON. Compañia Trasatlantica. Length, 500 ft. ; Gross Tonnage, 10,322 ; Funnel : Black.

GLENIFFER. Glen Line. Length, 500 ft. ; Gross Tonnage, 9,429 ; Funnel : Red, Black Top.

M.S. INDRAPOERA. Rotterdam Lloyd. Length, 500 ft.; Gross Tonnage, 10,500.

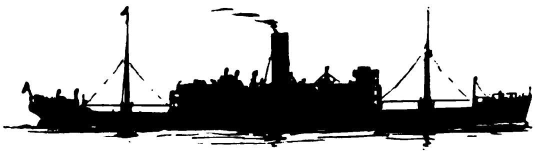
MAGDAPUR. MANIPUR. Anchor Brocklebank Line. Length, 499 ft. 6 ins.;
Gross Tonnage, 9,237;
Funnel: Black, White Band, Blue and White Stripe Band Black Top.

INFANTA ISABEL DE BORBON. Compañia Trasatlantica. Length, 498 ft.;
Gross Tonnage, 10,348;
Funnel: Black.

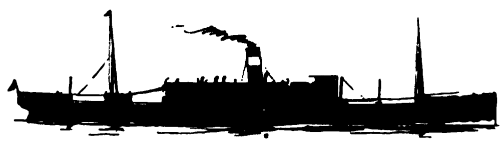
REINA VICTORIA EUGENIA. Compañia Trasatlantica. Length, 498 ft.;
Gross Tonnage, 10,137;
Funnel: Black.

HAKONE MARU. HAKOZAKI MARU. HARUNA MARU. Nippon Yusen Kaisha.
Length, 495 ft.; Gross Tonnage, 10,420;
Funnel: Black.

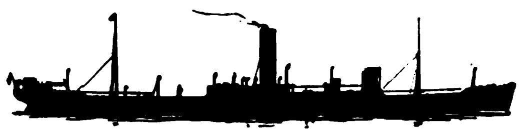
AENEAS. ANCHISES. ASCANUS. Blue Funnel Line. Length, 493 ft.; Gross Tonnage, 10,049;
Funnel: Blue, Black Top.



SARPEDON. **Blue Funnel Line.** Length, 491 ft.; Gross Tonnage, 11,400;
DARDANUS. ,, ,, Length, 459 ft.; Gross Tonnage, 7,900;
Funnel: Blue, Black Top.



CAXIAS. **Lloyd Brasileiro, Cie. de Nav.** Length, 491 ft.; Gross Tonnage, 9,791;
Funnel: Yellow, White Band.



CALCHAS. **Blue Funnel Line.** Length, 490 ft. 8 ins.; Gross Tonnage, 10,304;
Funnel: Blue, Black Top.

CITY OF NAGPUR. **Ellerman City Line.** Length, 490 ft.; Gross Tonnage, 10,138;
Funnel: Buff, White Band, Black Top.

CITY OF EXETER. **Ellerman City Line.** Length, 486 ft. 7 ins.; Gross Tonnage, 9,447;
Funnel: Buff, White Band, Black Top.

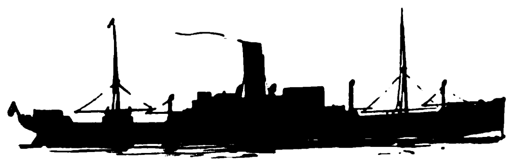
RUMUERA. **New Zealand Shipping Co.** Length, 485 ft.; Gross Tonnage, 11,276;
Funnel: Yellow.

GLENAPP. GLENBEG. GLENGARRY. GLENOGLE. Glen Line. Length, 485 ft. ; Gross Tonnage, 6,802 ; Funnel : Red, Black Top.

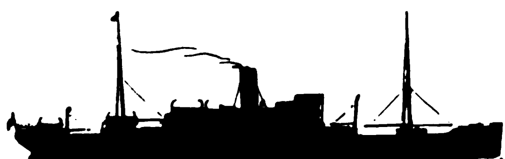
DINTELDYK. Holland Amerika. Length, 485 ft. ; Gross Tonnage, 8,400 ; Funnel : Buff, Two Blue Bands, White between, Buff Top.

M.S. LOCHKATRINE. Royal Mail Steam Packet Co. Length, 485 ft. ; Gross Tonnage, 9,409 ; Funnel : Buff.

CITY OF PARIS. Ellerman City Line. Length, 484 ft. 7 ins. ; Gross Tonnage, 10,245 ; Funnel : Buff, White Band, Black Top.



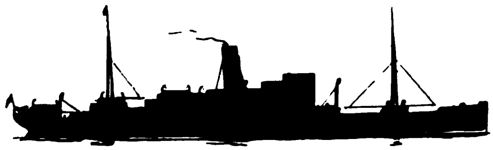
CEYLAN. MALTE. Chargeurs Reunis. Length, 483 ft. ; Gross Tonnage, 9,000 ; Funnel : Yellow, Red Stars on White Band.



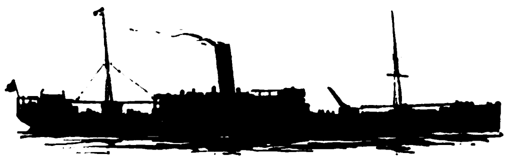
FORMOSE
GROIX. } **Chargeurs Reunis.** Length, 481 ft. 6 ins. ; Gross Tonnage, 10,500 ;
HOEDIC
BELLE ISLE. ,, ,, ,, ,, ,, ,, 9,591 ;
AURIGNY. ,, ,, ,, ,, ,, ,, 9,589 ;
DESIRADE
EUBEE } ,, ,, ,, ,, ,, ,, 9,580 ;

Funnel : Yellow, Red Stars on White Band.

PORT ADELAIDE. PORT AUCKLAND. PORT BOWEN. PORT CAMPBELL. PORT CAROLINE. PORT DARWIN. PORT DENISON. PORT HUNTER. PORT KEMBLA. PORT NICHOLSON. Commonwealth and Dominion Line. Length, 481 ft. 2 ins. ; Gross Tonnage, 8,422 ; Funnel : Red, Black Top.

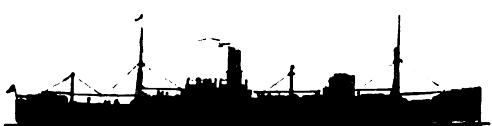


MEDUANA. MOSELLA. Cie. Sud Atlantique. Length, 481 ft.; Gross Tonnage, 10,500; Funnel: Yellow, Black Top.



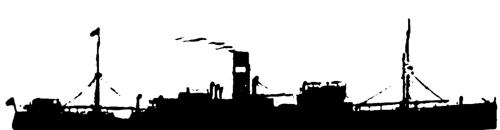
RUAHINE. New Zealand Shipping Co. Length, 480 ft. 7 ins.; Gross Tonnage, 10,839; Funnel: Yellow.

NEURALIA. NEVASA. British India S.N. Co. Length, 480 ft. 5 ins.; Gross Tonnage, 9,082; Funnel: Black, Two White Bands, Black Top.

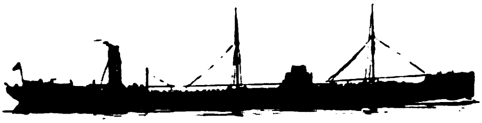


TURAKINA. New Zealand Shipping Co. Length, 480 ft.; Gross Tonnage, 10,000; Funnel: Yellow.

KASHGAR. KASHMIR. KALYAN. KARMALA. KHIVA. KHYBER. Peninsular and Oriental. Length, 479 ft. 9 ins.; Gross Tonnage, 8,840; Funnel: Black.

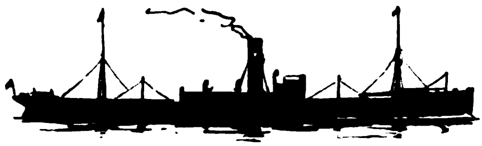


CITY OF SIMLA. Ellerman City Line. Length, 476 ft. 7 ins.; Gross Tonnage, 9,468; Funnel: Buff, White Band, Black Top.

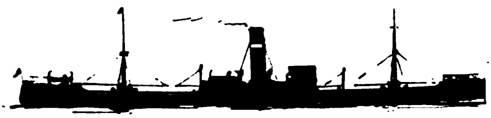


IROQUOIS. **Anglo-American Oil Co.** Length, 476 ft. 3 ins.; Gross Tonnage, 9,202; Funnel: Red, Black Top.

DUNLUCE CASTLE. DURHAM CASTLE. Union Castle. Length, 475 ft. 5 ins.; Gross Tonnage, 8,130; Funnel: Red, Black Top.

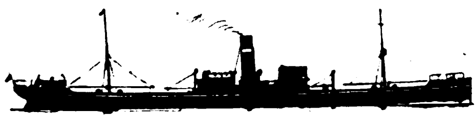


ARIZONA MARU. ALABAMA MARU. AFRICA MARU. MANILA MARU. HAWAII MARU. Osaka Shosen Kaisha. Length, 475 ft. Gross Tonnage, 9,500; Funnel: Black, Two White Bands, joined at Side.

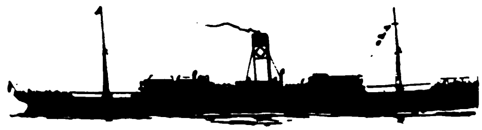


MAIDAN. MAHSUD. MAIHAR MALAKAND. MANAAR. MATHERAN. Anchor Brocklebank. Length, 470 ft. 4 ins.; Gross Tonnage, 8,077; Funnel: Black, White Band, Blue and White Stripe Band, Black Top.

DELTA. DEVANHA. DONGOLA. Peninsular and Oriental. Length, 470 ft. 3 ins.; Gross Tonnage, 8,097; Funnel: Black.



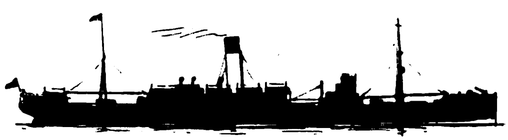
MALAKUTA. Anchor Brocklebank. Length, 470 ft. 2 ins.; Gross Tonnage, 7,205; Funnel: Black, White Band, Blue and White Stripe Band, Black Top.



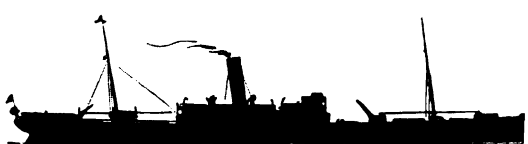
CALAMARES. **United Fruit Co.** Length, 470 ft.; Gross Tonnage, 7,782;
PASTORES. „ „ „ Length, 470 ft.; Gross Tonnage, 7,242;
Funnel: Buff, White Diamond on Red Band, Black Top.

MADURA. MALDA. MANTOLA. MATIANA. **British India S.N. Co.** Length, 465 ft. 2 ins.;
Gross Tonnage, 8,975;
Funnel: Black, Two White Bands, Black Top.

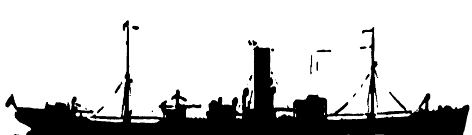
M.S. PORT DUNEDIN. PORT HOBART. **Commonwealth and Dominion Line.**
Length, 465 ft.; Gross Tonnage, 7,500;
Funnel: Red, Black Top.



ARAWA. TAINUI. **Shaw, Savill, and Albion Co.** Length, 460 ft.; Gross Tonnage, 9,372;
Funnel: Buff, Black Top.



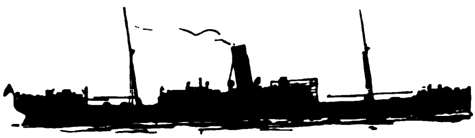
RIMUTAKA. RUAPEHU. **New Zealand Shipping Co.** Length, 457 ft. 6 ins.;
Gross Tonnage, 8,887;
Funnel: Yellow.



AGAPENOR. ELPENOR. EUMAEUS. GLAUCUS. HELENUS. LYCAON. MACHAON. MENTOR. PHEMUS. PYRRHUS. TEIRESIAS. TROILUS. **Blue Funnel Line.**
Length, 455 ft. 2 ins.; Gross Tonnage, 7,587;
Funnel: Blue, Black Top.

KONINGEN DER NEDERLANDEN. **Stoomvaart Maatschappy**
Length, 455 ft.; Gross Tonnage, 8,300;
Funnel: Buff, Black Top.

CLAN MACTAGGART. **Clan Line.** Length, 452 ft. 7 ins.; Gross Tonnage, 7,602;
CLAN MACTAVISH. ,, ,, Length, 469 ft.; Gross Tonnage, 7,619;
Funnel: Black, two Red Bands.



GARTH CASTLE. GRANTULLY CASTLE. **Union Castle.**
Length, 452 ft. 6 ins; Gross Tonnage, 7,715;
Funnel: Red, Black Top.

MANUEL ARNUS. **Compañia Trasatlantica.** Length, 451 ft. 6 ins.; Gross Tonnage, 7,578;
Funnel: Black.

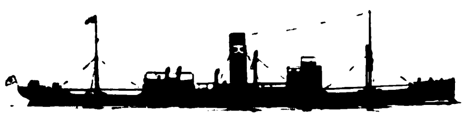
M.S. ABA. M.S. ADDA. **Elder Dempster.** Length, 450 ft. 3 ins.; Gross Tonnage, 7,938;
Funnel: Buff.

M.S. DORSETSHIRE. M.S. SOMERSETSHIRE. **Bibby Line.**
Length, 450 ft. 3 ins.; Gross Tonnage, 7,500;
Funnel: Salmon Pink, Black Top.

SICILIA. SOUDAN. Peninsular and Oriental.
Length, 450 ft. 2 ins. ; Gross Tonnage, 6,684 ;
Funnel : Black.

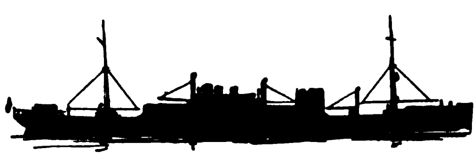
M.S. DOMALA, British India S.N. Co. Length, 450 ft. ; Gross Tonnage, 8,441 ·
Funnel : Black, Two White Bands, Black Top.

CIRCASSIA. Anchor Henderson. Length, 450 ft. ; Gross Tonnage, 7,180 ;
Funnel : Black.

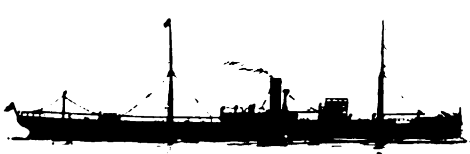


LONDON MARU. PARIS MARU. Osaka Shosen Kaisha. Length, 450 ft. ; Gross Tonnage, 7,600 ;
Funnel : Black, Two White Bands joined at Sides.

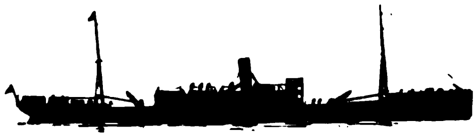
MAKURA. Union Steam Ship Co. of N.Z. Length, 450 ft. ; Gross Tonnage, 8,075 ;
Funnel : Red, Black Top.



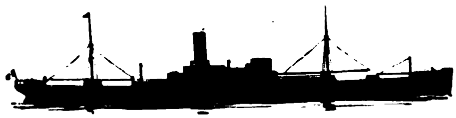
M.S. ESQUILINO. M.S. VIMINALE. Lloyd Triestino. Length, 450 ft. ;
Gross Tonnage, 10,000.



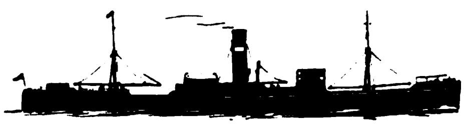
BAKARA. BARAMBAH. BOONAH. Australian Commonwealth Line.
Length, 450 ft. ; Gross Tonnage, 5,970 ;
Funnel : Black.



NANKIN. NOVARA. Peninsular and Oriental. Length, 449 ft. 7 ins.; Gross Tonnage, 7,058; Funnel: Black.



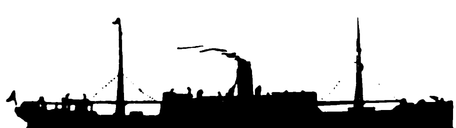
M.S. CAMRANH. Chargeurs Reunis. Length, 449 ft. 5 ins.; Gross Tonnage, 8,500; Funnel: Yellow, Red Stars on White Band.



MASIRAH. Anchor Brocklebank Line. Length, 448 ft.; Gross Tonnage, 6,836; Funnel: Black, White Band, Blue and White Stripe Band, Black Top.

ANCHORIA. Anchor Brocklebank Line. Length, 446 ft. 4 ins.; Gross Tonnage, 6,112; Funnel: Black, White Band, Blue and White Stripe Band, Black Top.

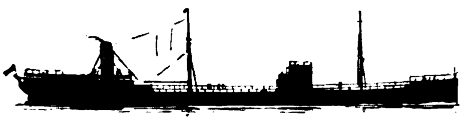
MAHRATTA. MAKALLA. Anchor Brocklebank Line. Length, 445 ft.; Gross Tonnage, 6,690; Funnel: Black, White Band, Blue and White Stripe Band, Black Top.



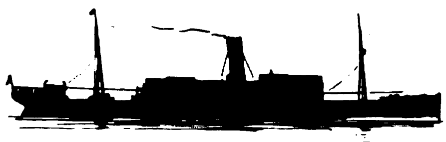
ANTONIO LOPEZ. Compañia Trasatlantica. Length, 440 ft.; Gross Tonnage, 5,975; Funnel: Black.

HILDEBRAND. Booth Line. Length, 440 ft. 3 ins.; Gross Tonnage, 6,995; Funnel: Black.

ELYSIA. **Anchor Henderson.** Length, 440 ft. ; Gross Tonnage, 6,368 ;
Funnel : Black.

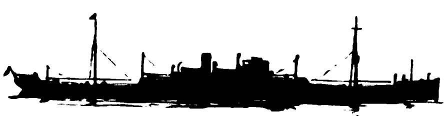


BRITISH MERCHANT. **British Tanker Co.** Length, 440 ft. ; Gross Tonnage, 7,400 ;
Funnel : Black, Two Red Bands, White Disc, B.T.C. in centre.

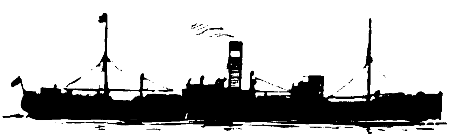


ZEELANDIA. **Koninklijke Hollandsch Lloyd.** Length, 440 ft. ; Gross Tonnage, 7,995 ;
Funnel : Yellow, Black Band.

CLAN URQUHART. **Clan Line.** Length, 440 ft. ; Gross Tonnage, 5,856 ;
Funnel : Black, Two Red Bands.

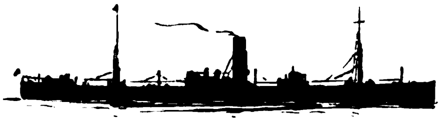


M.S. GLENAMOY. **Glen Line.** Length, 435 ft. ; Gross Tonnage, 7,269 ;
Funnel : Red, Black Top.

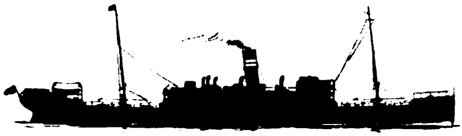


CITY OF NORWICH. **Ellerman (Hall Line).** Length, 434 ft. 4 ins. ; Gross Tonnage, 6,726 ;
Funnel : Buff, White Band, Black Top.

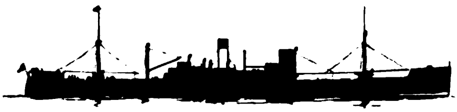
REINA MARIA CRISTINA. **Compañia Trasatlantica.** Length, 434 ft. ; Gross Tonnage, 4,817 ;
Funnel : Black.



NAGINA. British India Steam Navigation Co. Length, 433 ft.; Gross Tonnage, 6,650: Funnel: Black, Two White Bands.



TAKADA. TANDA. British India S.N.Co. Length, 430 ft. 1 in.; Gross Tonnage. 6,949; Funnel: Black, Two White Bands, Black Top.

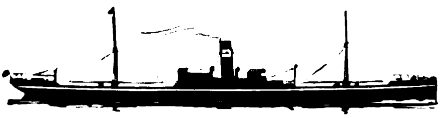


M.S. LEIGHTON. M.S. LINNELL. Lamport and Holt. Length, 430 ft.; Gross Tonnage, 7,412; Funnel: Light Blue, White Band, Black Top.

HARDWICKE GRANGE. Furness Withy (Houlder). Length, 430 ft.; Gross Tonnage, 9,005; Funnel: Black, Red Band with White Maltese Cross, Black Top.

MARQUESA. Furness (Houlder). Length, 430 ft.; Gross Tonnage, 8,979; Funnel: Black, Red Band with White Maltese Cross, Black Top.

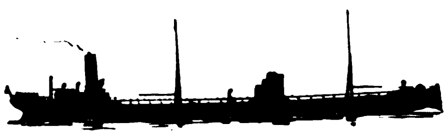
BAYANO. CAMITO. CORONADO. Elders and Fyffes.
Length, 425 ft. 5 ins.; Gross Tonnage, 6,788;
Funnel: Buff, Black Top.



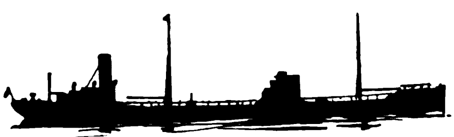
STOCKWELL. Anchor Brocklebank Line. Length, 425 ft.; Gross Tonnage, 5,643; Funnel: Black, White Band, Blue and White Stripe Band, Black Top.

CAIRNROSS. Cairns, Noble & Co. Length, 425 ft.; Gross Tonnage, 5,494;
Funnel: Black, Red Band, White Triangle.

KARAGOLA. British India S.N. Co. Length, 425 ft.; Gross Tonnage, 7,053;
Funnel: Black, Two White Bands, Black Top.

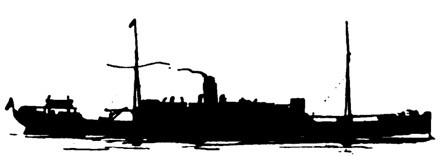


TUSCARORA. Anglo American Oil Co. Length, 425 ft.; Gross Tonnage, 7,106;
Funnel: Red, Black Top.



M.S. NARRAGANSETT. M.S. SEMINOLE. Anglo American Oil Co.
Length, 425 ft.; Gross Tonnage, 6,889;
Funnel: Red, Black Top.

BUENOS AIRES. Compañia Trasatlantica. Length, 422 ft.; Gross Tonnage, 5,311;
Funnel: Black.

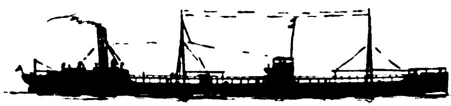


LEON XIII. Compañia Trasatlantica. Length, 421 ft.; Gross Tonnage, 5,086;
Funnel: Black.

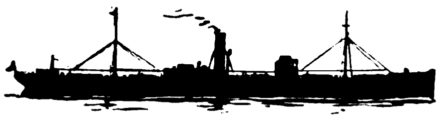
P. DE SATRUSTEGUI. Compañia Trasatlantica. Length, 421 ft. 10 ins.;
Gross Tonnage, 4,670;
Funnel: Black.

KAROOLA. KATOOMBA. McIlwraith, McEacharn. Length, 420 ft. 5 ins.; Gross Tonnage, 7,391; Funnel: Red, Black Top.

MARAMA. Union Steamship Co. of N.Z. Length, 420 ft. 3 ins.; Gross Tonnage, 6,497; Funnel: Red, Black Top.



SAN DUNSTANO. SAN EDUARDO. SAN RICARDO. SAN SILVESTRE. SAN TIRSO. SAN VALERIO. SAN ZEFERINO. Eagle Oil Transport Co., Ltd. Length, 420 ft. 2 ins.; Gross Tonnage, 6,220; Funnel: Black, Yellow Band, Black Eagle, Black O on White Band, Yellow Band.



ALNMOOR. CASTLEMOOR. Runciman. Length, 420 ft.; Gross Tonnage, 6,573; Funnel: Black, White Band, Blue R.

CAIRNVALONA. Cairns, Noble & Co. Length, 415 ft. 2 ins.; Gross Tonnage, 4,929; Funnel: Black, Red Band, White Triangle.

D'ENTRECSTEAUX. FORBIN.	**Chargeurs Reunis.**	Length,	415 ft.;	Gross Tonnage,	7,563;
DUPLEIX.	,,	,,	,,	,,	7,418;
ANGO.	,,	,,	,,	,,	7,393;
BOUGAINVILLE.	,,	,,	413 ft.;	,,	7,293;

Funnel: Yellow, Red Stars on White Band.

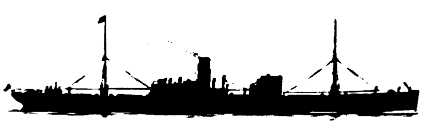
MUNARGO. Munson Steamship Co. Length, 415 ft.; Gross Tonnage, 6,484; Funnel: Blue, White Band, Black Top.

BELVIDERE. Cosulich Line. Length, 412 ft.; Gross Tonnage, 7,305; Funnel: Red, White Band, Black Top.

FORT ST. GEORGE. FORT VICTORIA. Furness Withy. Length, 411 ft. 3 ins.; Gross Tonnage, 7,785; Funnel: Black, Red, Thin Black and Red Bands, Black Top.

ERINPURA. British India S.N. Co. Length, 411 ft.; Gross Tonnage, 5,128; Funnel: Black, Two White Bands, Black Top.

ZEALANDIA. Huddart, Parker. Length, 410 ft.; Gross Tonnage, 7,000; Funnel: Yellow.



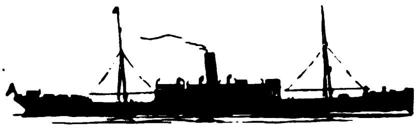
CLAN MACNAB. CLAN MACNAIR. CLAN MACNAUGHTON. CLAN MACNEIL. CLAN MONROE. CLAN MORRISON. CLAN MURDOCH. CLAN MURRAY. Clan Line. Length, 410 ft. 6 ins.; Gross Tonnage, 6,114; Funnel: Black, Two Red Bands.

MEDIA. Anchor Brocklebank. Length, 410 ft.; Gross Tonnage, 5,437; Funnel: Black, White Band, Blue and White Stripe Band, Black Top.

OCEAN PRINCE. Furness Withy. Length, 410 ft.; Gross Tonnage, 5,212; Funnel: Black, Red, Thin Black and Red Bands, Black Top.

ELLENGA. British India S.N. Co. Length, 410 ft.; Gross Tonnage, 5,196; Funnel: Black, Two White Bands, Black Top.

DRAMATIST. Harrison Line. Length, 410 ft.; Gross Tonnage, 5,443; Funnel: Black, Red Band between Two White.



C. LOPEZ Y LOPEZ. Compañia Trasatlantica. Length, 408 ft.; Gross Tonnage, 4.170; Funnel: Black.

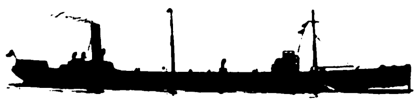
EGBA. Elder Dempster. Length, 406 ft.; Gross Tonnage, 4,989; Funnel: Buff.

EBOE. Elder Dempster. Length, 405 ft. 1 in.; Gross Tonnage, 4,866; Funnel: Buff.

HIGHLAND LADDIE. Nelson. Length, 405 ft.; Gross Tonnage, 7,381;
HIGHLAND LOCH. „ Length, 413 ft.; Gross Tonnage, 7,493;
HIGHLAND PIPER. „ Length, 413 ft.; Gross Tonnage, 7,490;
Funnel: Red, Two White Bands, Black Between, Black Top.

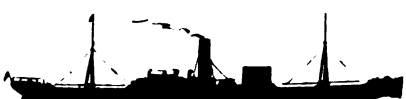
NEWFOUNDLAND. **Furness Withy.** Length, 405 ft. Gross Tonnage 6,820 ;
Funnel : Black, Red, Thin Red and Black Bands.

M.S. LOUISIANA. **Det Forenede Dampskibs Selskab.** Length, 405 ft. ; Gross Tonnage, 6,513 ;
Funnel : Flamingo Red, Black Top.



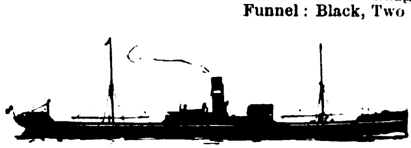
DAGHESTAN. **Oil Tanker.** **Hindustan Steam Shipping Co.** Length, 405 ft. ;
Gross Tonnage, 5,742 ;
Funnel : Black, Two White Bands, Vermilion Between, C in White.

GLENLUCE. **GLENTARA.** **Glen Line.** Length, 405 ft. ; Gross Tonnage, 6,755 ;
Funnel : Red, Black Top.

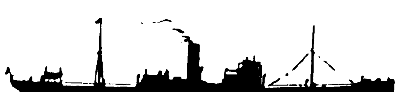


KALIMBA. **ROMERA.** **Maclay and McIntyre.** Length, 402 ft 8 ins. ; Gross Tonnage, 4892 ;
Funnel : Yellow, Black Top.

BREDA. **BRIELLE.** **Koninklijke Nederlandsche Stoomboot Mij.** Length, 402 ft. ;
Gross Tonnage, 6,915 ;
Funnel : Black, Two White Bands.



HOLYWELL. **Anchor Brocklebank.** Length, 401 ft. 8 ins. ; Gross Tonnage, 4,867 ;
Funnel : Black, White Band, Blue and White Stripe Band, Black Top.



HALIZONES. **Houston Line.** Length, 400 ft. 8 ins. ; Gross Tonnage, 5,273 ;
Funnel : Red, Two Black Bands, Black Top.

CHALEUR. CHAUDIERE. CHIGNECTO. Royal Mail Steam Packet Co.
Length, 400 ft. 5 ins.; Gross Tonnage, 4,890;
Funnel: Buff.

ABINSI. Elder Dempster. Length, 400 ft. 5 ins.; Gross Tonnage, 6,365;
Funnel: Buff.

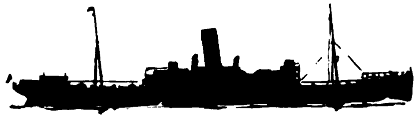
ARIANO. Gulf Line. Length, 400 ft. 4 ins.; Gross Tonnage, 5,155;
Funnel: Black, Wide Red Band, Narrow Red Band Below.

NORWEGIAN. Leyland Line. Length, 400 ft. 2 ins.; Gross Tonnage, 6,357;
Funnel: Buff, Black Top.

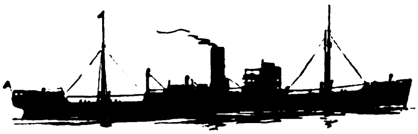
MANISTEE. PATIA. ZENT. Elders and Fyffes. Length, 400 ft. 2 ins.; Gross Tonnage, 5,360;
Funnel: Buff, Black Top.

EDAVANA, ELEPHANTA. British India S.N. Co. Length, 400 ft.; Gross Tonnage, 5,284;
Funnel: Black, Two White Bands, Black Top.

CANADIAN VICTOR. Canadian Government Merchant Marine. Length, 400 ft.;
Gross Tonnage, 5,493;
Funnel: Yellow, Black Top.



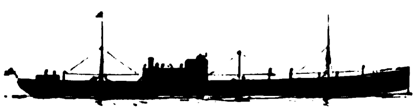
ANSELM. Booth Line. Length, 400 ft. ; Gross Tonnage, 5,450 ;
Funnel : Black.



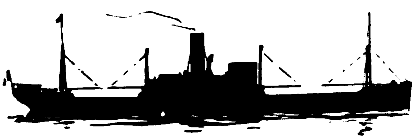
M.S. DOLIUS. Blue Funnel Line. Length, 400 ft. ; Gross Tonnage, 5,700 ;
Funnel : Blue, Black Top.

ORANGEMOOR. Runciman. Length, 399 ft. 6 ins. ; Gross Tonnage, 6,573 ;
Funnel : Black, White Band, Blue R.

CAIRNDHU. Cairns, Noble & Co. Length, 399 ft. 3 ins. ; Gross Tonnage, 5,250 ;
CAIRNGOWAN. „ „ Length, 400 ft. ; Gross Tonnage, 5,295 ;
Funnel : Black, Red Band, White Triangle.

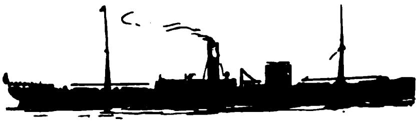


M.S. LULE. Grängesberg Oxelösund Co. Length, 399 ft. ; Gross Tonnage, 5,630 ;
Funnel : Buff, Blue Band, Gold Emblem.



BAOULE.
CASAMANCE. } **Chargeurs Reunis.** Length, 391 ft. ; Gross Tonnage, 5,900 ;
DAHOMEY.
ADRAR. „ „ „ „ „ „ 5,355 ;
Funnel : Yellow, Red Stars on White Band.

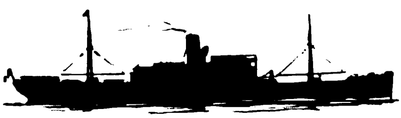
ANGORA. British India S.N. Co. Length, 390 ft. 8 ins. ; Gross Tonnage, 4,298 ;
Funnel : Black, Two White Bands, Black Top.



CAIRNMONA. Cairns, Noble & Co. Length, 390 ft. 2 ins.; Gross Tonnage, 4,666; Funnel: Black, Red Band, White Triangle.

ARONDA. British India S.N. Co. Length, 390 ft. 2 ins.; Gross Tonnage, 4,062; Funnel: Black, Two White Bands, Black Top.

VARELA. VARSOVA. VITA. British India S.N. Co. Length, 390 ft. 1 in.; Gross Tonnage, 4,645; Funnel: Black, Two White Bands, Black Top.



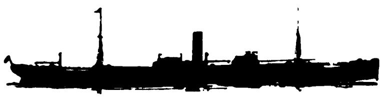
AMIRAL NEILLY. AMIRAL PONTY. AMIRAL LATOUCHE TREVILLE. Chargeurs Reunis. Length, 389 ft. 5 ins.; Gross Tonnage, 5,582; Funnel: Yellow, Red Stars on White Band.

OLJAREN. Transatlantic S.S. Co. Length, 389 ft.; Gross Tonnage, 5,450; Funnel: Yellow, Black Top.

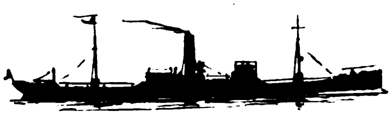
LEGAZPI. Compañia Trasatlantica. Length, 389 ft.; Gross Tonnage, 4,339; Funnel: Black.

COOEE. Australian Commonwealth Line. Length, 387 ft 8 ins.; Gross Tonnage, 4.256; Funnel: Black.

MONTSERRAT. **Compañia Trasatlantica.** Length, 386 ft. 1 in.; Gross Tonnage, 3,994; Funnel: Black.



SCATWELL. **Cairns, Noble & Co.** Length, 385 ft.; Gross Tonnage, 4,425; Funnel: Black, Red Band, White Triangle.

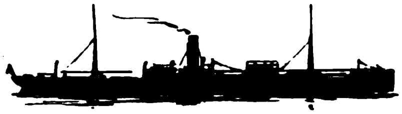


HALESIUS. **Houston Line.** Length, 385 ft.; Gross Tonnage, 4,652; Funnel: Red, Two Black Bands, Black Top.

HESPERIDES. **Houston Line.** Length, 382 ft. 5 ins.; Gross Tonnage, 3,914; Funnel: Red, Two Black Bands, Black Top.

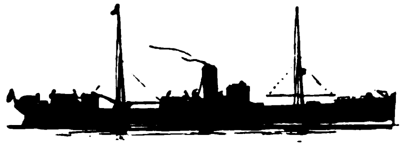
DENIS. STEPHEN. **Booth Line.** Length, 376 ft. 4 ins.; Gross Tonnage, 4,435; Funnel: Black.

AIDAN. **Booth Line.** Length, 375 ft. 9 ins.; Gross Tonnage, 4,545; Funnel: Black.

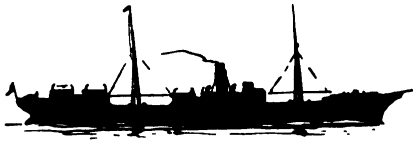


PARATTAH. **Australian Commonwealth Line.** Length, 375 ft. 6 ins.; Gross Tonnage, 4,229; Funnel: Black.

ALBAN. **Booth Line.** Length, 375 ft. 2 ins.; Gross Tonnage, 5,223; Funnel: Black.

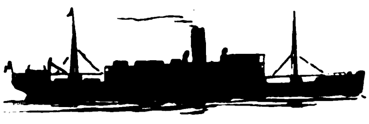


ISLA DE PANAY. **Compañia Trasatlantica.** Length, 373 ft.; Gross Tonnage, 3,484; Funnel: Black.

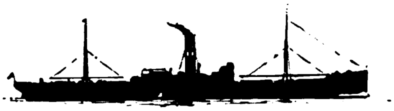


ALICANTE. **Compañia Trasatlantica.** Length, 372 ft. 2 ins.; Gross Tonnage, 3,879; Funnel: Black.

SPEAKER. **Harrison Line.** Length, 370 ft.; Gross Tonnage, 4,264; Funnel: Black, Red Band between Two White.

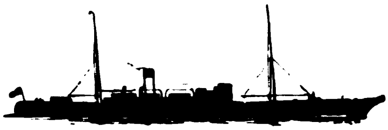


EUROPE. **Chargeurs Reunis.** Length, 369 ft.; Gross Tonnage, 5,453; Funnel: Yellow, Red Stars on White Band.



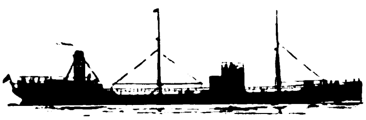
SANTA AURORA. Eagle Oil Transport Co., Ltd. Length, 367 ft. 5 ins. ; Gross Tonnage, 4,278 ;
Funnel : Black, Yellow Band, Black Eagle, Black O on White Band, Yellow Band.

HESIONE. Houston Line. Length, 361 ft 7 ins. ; Gross Tonnage, 4,125 ;
Funnel : Red, Black Top.



JOHN W. MACAY. Commercial Cable Co., N.Y. Length, 360 ft. ; Gross Tonnage, 4,049 ;
Funnel : Buff, Black Top.

CUTHBERT. JUSTIN. Booth Line. Length, 355 ft. Gross Tonnage, 3,843 ;
Funnel : Black.

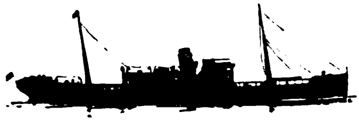


BRITISH COMMERCE. BRITISH ENTERPRISE. BRITISH TRADER. British Tanker Co.
Length, 351 ft. 4 ins. ; Gross Tonnage, 4,205 ;
Funnel : Black, Two Red Bands, White Disc, B.T.C. in centre.

REGELE CAROL I. Roumanian State. Length, 350 ft. ; Gross Tonnage, 2,370 ;
Funnel : White, Black Top.

M.S. MALIA. Anchor Brocklebank. Length, 350 ft. 5 ins. ; Gross Tonnage, 3,872 ;
Funnel : Black, White Band, Blue and White Striped Band, Black Top.

POLYCARP. Booth Line. Length, 340 ft. 7 ins.; Gross Tonnage, 3,577;
Funnel; Black.



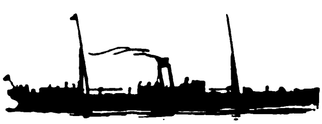
BARODA. British India S.N. Co. Length, 330 ft. 4 ins.; Gross Tonnage, 3,172;
Funnel: Black, Two White Bands, Black Top.

ISLE OF THANET. MAID OF KENT. Southern Railway. Length, 329 ft.;
Gross Tonnage, 2,664;
Funnel: White Black Tops.

LA MAREA. LA PERLA. LA PLAYA. United Fruit Co. Length, 325 ft.;
Gross Tonnage, 3,830;
Funnel: Buff, White Diamond on Red Bank, Black Top.

MICHAEL. Booth Line. Length, 300 ft. 5 ins.; Gross Tonnage, 3,172;
Funnel: Black.

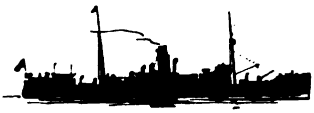
SLIEVEBAWN. SLIEVEMORE. London, Midland and Scottish Railway.
Length, 300 ft. 2 ins.; Gross Tonnage, 1,061;
Funnel: Yellow, Black Top.



SLIEVE DONARD. London, Midland and Scottish Railway.
Length, 300 ft.; Gross Tonnage, 1,116;
Funnel: Yellow, Black Top.

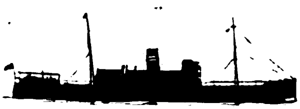
SNOWDEN. **London, Midland and Scottish Railway.** Length, 299 ft. 9 ins.; Gross Tonnage, 1021;
SOUTH STACK. „ „ Length, 299 ft.; Gross Tonnage, 977;
Funnel: Yellow, Black Top.

SLIEVEGALLION. **London, Midland and Scottish Railway.**
Length, 299 ft. 5 ins.; Gross Tonnage, 1,071;
Funnel: Yellow, Black Top.



SAN CARLOS. **Compañia Trasatlantica.** Length, 291 ft.; Gross Tonnage, 2,491;
Funnel: Black.

PRINCESS ADELAIDE. **Canadian Pacific.** Length, 290 ft. 5 ins.; Gross Tonnage, 3,061;
Funnel: Yellow.



M.S. DUMRA. **British India S.N. Co.** Length, 280 ft.; Gross Tonnage, 2,000
Funnel: Black, Two White Bands, Black Top.

GALTEE MORE. ROSSTREVOR. **London, Midland and Scottish Railway.**
Length, 276 ft. 1 in.; Gross Tonnage, 1,112;
Funnel: Yellow, Black Top.

CADILLAC. SARANAC. **Anglo American Oil Co.** Length, 530 ft. 2 ins.;
Gross Tonnage, 12,074;
Funnel: Red Black Top.

DIMENSIONS AND PARTICULARS

OF

BRITISH AND FOREIGN WARSHIPS.

LIST OF BRITISH AND FOREIGN SHIPS.

The following abbreviations are used throughout the Alphabetical List:—

a.c.	Armoured cruiser.
a.g.b.	Armoured gunboat.
b.	Battleship.
b.c.	Battle-cruiser.
l.cr.	Light cruiser.
Flot. ldr.	Flotilla leader.
c.d.s.	Coast-defence ship.
P. L. Cr.	Protected light cruiser.
M.Cr.	Minelaying cruiser.
cr.	Cruiser.
A.A.	Anti-aircraft guns. (H.A. = High angle)
A.C.	Aircraft carrier.
A.T.	Aircraft tender.
g.b.	Gunboat.
g.v.	Gun-vessel.
H.A.	High angle = A.A. Anti-aircraft.
H.N.S.	Harvey nickel steel.
H.S.	Harveyised or similar hard-faced steel.
K.S.	Krupp steel.
p.v.	Patrol vessel.
t.	Turret-ship (in class column).
t.	Speed and H.P. at trials (in speed and H.P. columns).
to.cr.	Torpedo-cruiser.
to.g.b.	Torpedo-gunboat.

l.	Light guns under 15 cwt., including boats' guns.
M.	Machine guns.
sub.	Submerged torpedo tube.

The following abbreviations are used to distinguish the various types of boilers:—

W.T.	Water-tube boilers, where the type is not known.
B.	Belleville.
Bl.	Blechynden.
B. & W.	Babcock and Wilcox.
D'A.	D'Allest.
My.	Myabara.
N. or Nic.	Niclausse.
Nor.	Normand.
N.S.	Normand-Sigaudy.
T.	Thornycroft.
T.S.	Thornycroft-Schulz.
Y^1.	Yarrow small tube.
Y^2.	Yarrow large tube.

The following abbreviations distinguish types of turbines:—

P.T.	Parsons.
(G.)	Geared turbines.
C.T.	Curtis.
B.C.T.	Brown-Curtis.

A reference is now given in the tables to the pages on which diagrams of the ships appear.

GREAT BRITAIN.—Armoured Ships.

Class.	NAME. DATE FOR SCRAPPING.	Displacement.	Length.	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons	ft.	ft. ins.	ft. ins.						£	in.	in.	in.	in.	in.	in.			knots.	tons	
b.	Ajax . . . 1925 *See p. 408.*	23,000	555	89 0	27 6	28,000 B. & W.	Greenock	Scott . P.T.	1912	1913	1,937,631*	12–6	$2\frac{1}{2}$–1	9	$1\frac{3}{4}$–1	10	3–1	10 *13·5-in.*, 12 *4-in.*, 2 *3-in.* A.A.; 4 *3-pr.*, 5 M.; 10 L.	2	21 *t*	3150 / 850	1132
b.	Barham . . 1935 *See p. 406.*	27,500	600	90 6	28 9	75,000 B. & W.	Clydeb'nk	J. Brown B.C.T.	1914	1915	..	13–6	3–1	6	4–2	10	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 2 *3-in.* A.A.; 5 M.; 10 L	4	25	Oil 3400	1279
b.	Benbow . . 1934 *See p. 407.*	25,000	580	90 0	28 0	29,000 B. & W.	Dalmuir .	Beardmore P.T.	1913	1914	2,027,115*	12–8	1–$2\frac{1}{2}$	9–8	1–$1\frac{1}{2}$	10	6	10 *13·5-in.*, 12 *6-in.*, 4 *3-pr.* 2 *3-in.* A.A.; 5 M.; 10 L.	4	21	3250 / 1050 Oil	1213
b.	Centurion . 1925 *See p. 408.*	23,000	555	89 0	27 6	28,200 Y²	Devonp'rt	Hawthorn P.T.	1911	1913	1,939,648*	12–6	$2\frac{1}{2}$–1	9	$1\frac{3}{4}$–1	10	3–1	10 *13·5-in.*, 12 *4-in.*, 4 *3-pr.*; 5 M.; 10 L.	2	21 *t*	3150 / 850	1135
b.	Emperor of India . 1934 *See p. 407.*	25,000	580	90 0	28 0	29,000 Y.	Barrow .	Vickers . P. T.	1913	1914	2,020,017*	12–8	1–$2\frac{1}{2}$	9–8	1–$1\frac{1}{2}$	10	6	10 *13·5-in.*, 12 *6-in.*, 4 *3-pr.*, 2 *3-in.* A.A.; 5 M.; 10 L.	4	21	3250 / 1050 Oil.	1195
b.c.	Hood . . 1941 *See p. 410.*	41,200	810	105 $2\frac{1}{2}$	28 6	144,000	Clydeb'k	J. Brown . B.C.T. (G.)	1918	1920	5,843,039*	12–6	3–1	7–5	5–4	15–11	(*a*)	8 *15-in.*, 12 *5·5-in.*, 4 *4-in.* A.A., 4 *3-pr.*	4 (deck) 2 (sub.)	31	4000 Oil	1482
b.	Iron Duke . 1934 *See p. 407.*	25,000	580	90 0	28 0	29,000 B. & W.	Portsm'th	Cammell Laird P.T.	1912	1914	2,080,918	12–8	1–$2\frac{1}{2}$	9–8	1–$1\frac{1}{2}$	10	6	10 *13·5-in.*, 12 *6-in.*, 4 *3-pr.* 2 *3-in.* A.A.; 5 M.; 10 L.	4	21 *t*	3250 / 1050 Oil	1235
b.	King George V. 1925 *See p. 408.*	23,000	555	89 0	27 6	28,005 B. & W.	Portsm'th	Parsons . P.T.	1911	1912	1,965,413*	12–6	$2\frac{1}{2}$–1	9	$1\frac{3}{4}$–1	10	3–1	10 *13·5-in.*, 12 *4-in.*, 2 *3-in.* A.A.: 4 *3-pr.* 5 M.; 10 L.	2	21 *t*	2870 / 850	1133

b.	**Malaya**¶ 1934 *See p. 406.*	27,500	600	90	9	28	9	75,000 B. & W.	Walker	Wallsend P. T.	1915	1916	*	13-6	3-1	6	4-2	10	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	4	25	Oil 3400	1234
b.	**Marlborough** 1934 *See p. 407.*	25,000	580	90	0	28	0	29,000 Y²	Devonport	Hawthorn P.T.	1912	1914	2,043,437	12-8	1-2½	9-8	1-1½	10	6	10 *13·5-in.*, 12 *6-in.*, 4 *3-pr.*, 2 *3-in.* A.A.; 5 M; 10 L.	4	21 *t*	3250 / 1050 Oil	1193
b.	**Nelson** 1942	35,000	702	106	0	30	0	..	N'wc'stle-on-Tyne	Wallsend	1925	..	7,000,000*	..	..	..	..	..	..	9 *16-in.*, 12 *6-in.*	..	..	..	..
b.	**Queen Elizabeth** 1935 *See p. 406.*	27,500	600	90	6	28	9	75,000 B. & W.	Portsm'th	Wallsend P.T.	1913	1915	..	13-6	3-1	6	4-2	10	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 2 *3-in.* A.A.; 5 M.; 10 L.	4	25	Oil 3400	1299
b	**Ramillies** 1941	25,750	580	101	6	25	6	40,000 Y.	Dalmuir	Beardmore, P.T.	1916	1917	.	13-6	4-1	6	6-4	11	6	8 *15-in.*, 14 *6-in.*, 4 *3-pr.*, 2 *4-in.* A.A.; 5 M.; 10 L.	4	23	3250 Oil	1201
b.	**Resolution** 1937 *See p. 405.*			‡101	4	26	3		Jarrow	Palmer P.T.	1915	1916												
b.	**Revenge** 1937	25,750	580	‡101	5	26	3	40,000 Y.	Barrow	Vickers P.T.	1915	1916	..	13-6	4-1	6	6-4	11	6	8 *15-in.*, 14 *6-in.*, 4 *3-pr.*, 2 *4-in.* A.A.; 5 M; 10 L.	4	23	3250 Oil.	1219
b.	**Royal Oak** 1938			‡102	1	25	6		Devonp'rt	Hawthorn P.T.	1914	1916	2,468,269											1201
b.	**Royal Sovereign** 1936 *See p. 405.*			‡102	0	26	3		Portsm'th	Parsons P.T.	1915	1916	2,570,929											1201
b.c.	**Renown** 1940	26,500	750	90	0	25	6	112,000 B. & W.	Govan	Fairfield B.C.T.	1916	1916	3,111,284	6-3 K.C.	2	6·3	4-3	9-7 K.C.	6 K.C.	6 *15-in.*, 15 *4-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	2 (sub.) 8 a.w.	31·5	4250 Oil.	1240
b.c.	**Repulse** 1939 *See p. 411.*			102	8	23	3		Clydeb'nk	J. Brown B.C.T.	1916	1916	2,760,062											
b.	**Rodney** 1942	35,000	702	106	0	30	0	..	Birkenh'd	Cammell Laird	1925	..	7,000,000*	..	..	..	..	..	..	9 *16-in.*, 12 *6-in.*	..	..	..	..
b.	**Thunderer** 1925 *See p. 409.*	22,500	545	88	6	27	6	27,604 B. & W.	Blackwall	Thames Ironworks P. T.	1911	1912	1,889,920*	12	..	9	..	10	Nil.	10 *13·5-in.*, 8 *4-in.*, 1 *3-in.* A.A., 4 *3-pr.*; 5 M.; 10 L.	2	21	3300 / 800	1110

* Total estimated cost of ship including guns. ‡ Over rubbers. ¶ Built at the charge of the Federated Malay States. (*a*) Guns are in shields of 1-in. H.T. plating.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME. DATE FOR SCRAPPING.	Displacement.	Length.	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.c.	**Tiger** . . 1935 *See p.* 412.	28,500	660	90 6	28 6	108,000 B. & W.	Clydeb'nk	J. Brown . B. C. T.	1913	1914	2,500,000*	9–3	3–1	6	4–2	9	6	8 *13·5-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	4	30	†2800 / 3480	1110
b.	**Valiant** . 1939 *See p.* 406.	27,500	600	90 6	28 9	75,000 B. & W.	Govan .	Fairfield . B. C. T.	1914	1916	..	13–6	3–1	6	4–2	10	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 2 *3-in.* A.A.; 5 M.; 10 L.	4	25	Oil / 3400	1234
b.	**Warspite** . 1935 *See p.* 406.	27,500	600	90 6	28 9	75,000 B. & W.	Devonp'rt	Hawthorn P.T.	1913	1915	..	13–6	3–1	6	4–2	10	6	8 *15-in.*, 12 *6-in.*, 4 *3-pr.*, 4 *4-in.* A.A.; 5 M.; 10 L.	4	25	Oil / 3400	1234

* Total estimated cost of ship, including guns.

† Total fuel carried not to exceed 4900 tons.

The dates placed under the names of ships indicate the years in which they are to be scrapped according to the Washington Treaty.
The following ship is in the non-effective category: Agamemnon, battleship, Fleet target service.

River Gunboats.

Two classes of river gunboats were added to the Navy during the war. The larger class has a displacement of 640 tons, length 230 ft., beam 36 ft., draught 4 ft., H.P. 2,000, speed 14 knots, armament, two 6-in., two 12-prs., six M.; fuel capacity, coal 35, oil 54 tons. Names:—Aphis, Bee, Cicala, Cockchafer, Cricket, Glowworm, Gnat, Ladybird, Mantis, Moth, Scarab and Tarantula. The smaller class has been scrapped. Older vessels of this category still remaining in commission are the Moorhen, Robin, Teal, Widgeon, Woodcock, and Woodlark.

GREAT BRITAIN.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam. (Extreme.)	Draught.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
M.Cr.	Adventure	—	—	—	—	—	Devonp'rt	Vickers	—	Bldg.	..	..	..	..	..	..	..	..
A.C.	Argus	14,450	565	*68 8	21 0	20,000	Dalmuir	Beardmore T.	1917	1918	..	..	..	2 4-in.. 4 4-in. A.A., 4 3-pr., 4 M., 10 L.	..	20¾	2000	401
A.C.	Ark Royal	7080	366	50 10	17 6	3000	Blyth	Blyth S. B. Co.	1914	1914	..	..	..	4 12-pr., 4 M., 10 L.	..	11	500 Oil.	139
Cr.	Berwick	—	—	—	—	—	Govan	Fairfield	—	Bldg.	..	..	..	..	..	..	..	..
Cr.	Cornwall	—	—	—	—	—	Devonp'rt	Beardmore	—	Bldg.	..	..	..	..	..	..	..	..
Cr.	Kent	—	—	—	—	—	Chatham	Leslie Hawthorn	—	Bldg.	..	..	..	..	..	..	..	..
Cr.	Suffolk	—	—	—	—	—	Ports-mouth	Parsons	—	Bldg.	..	..	..	..	..	..	..	..
Cr.	Cumberland	—	—	—	—	—	Barrow	Vickers	—	Bldg.	..	..	..	..	..	..	..	..
Cr.	Birmingham *See p. 419.*	5440	430	49 10	15 10	26,500	Elswick	Hawthorn. T.	1913	1914	353,437*	..	..	9 6-in., 4 3-pr., 1 3-in. A.A., 2 M., 8 L.	2	25·5	1120 / 260	549
A.C.	Courageous (a)	18,600	735	81 0	22 3	90,000 Y.	Walker (Armstr'g)	Parsons P.T.(G.)	1916	1917	..	3	9–7	..	2 / 12	31	Oil / 3250	1146
A.C.	Glorious (a) *See p. 413.*						Belfast	Harland & Wolff T.(G.)										
A.C.	Furious	19,100	735	88 0	21 6	90,000	Walker (Armstrong)	Wallsend Engn'g Co. T.(G.)	1916	1917	1,920,000†	3	7	10 5·5-in., 6 4-in. A.A., 4 3-pr., 14 M.	2 / 16	31	Oil / 4025	1146

(a) Conversion to aircraft-carrier now proceeding at Devonport and Rosyth respectively.

* Extreme breadth under water. Breadth over lifeboat stowages is 110 ft. 5 ins.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam. (Extreme.) ft.	Beam ins.	Draught. ft.	Draught ins.	Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ins.	ft.	ins.						£	in.	in.			knots.	tons.	
P. L. Cr.	Calliope								Chath'm	Parsons P.T.(G.)	1914	1915							Oil.	368
„ „	Carysfort								Pembroke	Hawthorn. B.C.T.	1914	1915							805 / 917	379
„ „	Champion								Newcastle (Hawth'rn)	Hawthorn. P.T.(G.)	1914	1915							895	368
„ „	Cleopatra	3750	420	41	6	13	6	40,000	Devonport	Cammell Laird P.T.	1914	1915	..	3	..	4 6-*in.*, 2 3-*in.* A.A.‡ 2 2-*pr.* Pom Poms; 1 M.; 8 L.	4 §	29	917	368
„ „	Comus								Newcastle (Swan Hunter)	Wallsend Engn'g Co. P.T.	1914	1915							917	368
„ „	Conquest *See p.* 418.								Chatham	Scotts' P.T.	1914	1915							917	381
„ „	Cairo								Birken-head	Cammell Laird T.(G.)	1918	1919								
„ „	Calcutta								Barrow	Vickers T.(G.)	1918	1919								
„ „	Cape Town	4190	425	43	6	14	1	40,000	Birken-head	Cammell Laird T.(G.)	1919	1922	..	3	..	5 6-*in.*, 2 3-*in* A.A., 4 3-*pr.*; 2 2-*pr.* Pom Poms.	8	29	Oil / 950	432
„ „	Carlisle								Govan	Fairfield T.(G.)	1918	1918								
„ „	Colombo *See p.* 417.								Govan	Fairfield T.(G.)	1918	1919								
„ „	Caledon								Birken-head	Cammell Laird T.(G.)	1916									
„ „	Calypso	4120	425	42	9	14	1	40,000	Glasgow	Scotts' T.(G.)	1917	1917	300,000	3	..	5 6-*in.*, 2 3-*in.* A.A., 4 3-*pr.*; 2 2-*pr.* Pom Poms; 2 M.; 8 L.	8	29	Oil / 935	440
„ „	Caradoc *See p.* 417.								Barrow	Vickers T.(G.)	1916									

P. L. Cr.	**Cambrian**	3750	420	41	6	13	6	40,000	Pembroke	Cammell Laird T.	1916	1916	300,000†	3	..	4 *6-in.*, 2 *3-in.* A.A., 4 *3-pr.*, 2 *2-pr.*, Pom Poms; 1 M.; 8 L.	2	29	Oil 841	368
" "	**Canterbury**								Clydebank	J. Brown T.	1915	1916								
" "	**Castor**								Birkenhead	Cammell Laird T.	1915	1915								
" "	**Constance**. *See p.* 418.								Birkenhead	Cammell Laird T.	1915	1916								
" "	**Cardiff**	4190	425	43	6	14	1	40,000	Govan	Fairfield T. (G.)	1917	1917	..	3	..	5 *6-in.*, 2 *3-in.* A.A., 4 *3-pr.*, 2 *2-pr.* Pom Poms.	8	29	Oil 950	460
" "	**Ceres**								Clydebank	J. Brown T. (G.)	1917	1917								
" "	**Coventry**								Newcastle (Swan Hunter)	Swan Hunter T. (G.)	1917	1918								
" "	**Curacoa**								Pembroke	Harland & Wolff T. (G.)	1917	1918								
" "	**Curlew** *See p.* 417.								Barrow	Vickers P.T. (G.)	1917	1917								
" "	**Centaur**	3750	420	42	0	13	6	40,000	Elswick	Armstrong T.	1916	1916	300,000†	3	..	5 *6-in.*, 2 *3-in.* A.A., 2 *3-pr.*, 2 *2-pr.* Pom Poms; 2 M.; 8 L.	2	29	Oil 840	437
" "	**Concord** *See p.* 417.								Elswick	Armstrong T.										
Cr.	**Chatham**	5400	430	49	10	15	9	25,000	Chatham	Thames Co.	1912	1912	..	3	..	8 *6-in.*, 1 *3-in.* A.A., 4 *3-pr.*; 2 M.; 8 L.	2	25·5	1060 / 260	429
Cr.	**Dartmouth** *See p.* 419.	5250	430	48	6	15	6	23,467 Y.	Barrow	Vickers P.T.	1911	1911	329,406*	2–3	..	8 *6-in.*, 4 *3-pr.*, 4 M., 1 *3-in.* A.A.	2	25·9 ‡	1290 / 260	539
P. L. Cr.	**Despatch**	4765	445	46	6	14	3	40,000	Govan	Fairfield T. (G.)	1919	1922	..	3	Shields	6 *6-in.*, 2 *4-in.* A.A., 2 M.	12	29	Oil 1050	460
" "	**Diomede** *See p.* 416.	4750							Barrow	Vickers T. (G.)	1919	1922								
" "	**Danae**	4750	445	46	0	14	3	40,000	Elswick	Armstrong T. (G.)	1918	1918	..	3	Shield	6 *6-in.*, 3 *4-in.* A.A., 2 M.	12	29	Oil 1050	460
" "	**Dauntless**								Jarrow	Palmer T. (G.)	1918	1918								
" "	**Dragon** *See p.* 416.								Green'ck	Scott T. (G.)	1917	1918								

* Total estimated cost of ship, including guns. † Estimated cost as originally designed. ‡ The Champion of this class has 4-in. anti-aircraft guns; Comus, Carysfort, and Calliope have 4 3-pr. § Champion and Calliope have 2 submerged tubes.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam. (Extreme.)	Draught.	Indicated Horse Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft. ins.	ft. ins.						£	in.	in.			knots.	tons.	
P. L. Cr.	**Delhi**	4750	445	46 0	14 3	40,000	Elswick	Armstrong T. (G.)	1918	1919	..	3	Shields	6 *6-in.*, 3 *4-in.* A.A. (Durban 2 *4-in.* A.A.), 2 M.	12	29	Oil / 1050	460
" "	**Durban** *See p.* 416.	4765					Green'ck	Scott T. (G.)	1919	1921								
Cr.	**Dublin** *See p.* 419.	5400	430	49 10	15 9	25,000 Y.	Dalmuir	Beardmore P. T.	1912	1913	337,565*	3 / —	..	8 *6-in.*, 1 *3-in.* A.A., 4 *3-pr.*, 2 M., 8 L.	2	25·5	1100 / 260	495
A.C.	**Eagle,** *ex* Almirante Cochrane.	22,790	625	105 2	21 11	50,000	Walker	J. Brown T.	1918	1924	3,310,042	..	..	9 *6-in.*, 5 *4-in.* A.A., 4 *3-pr.*	..	24	3750 / Oil	834
P. L. Cr.	**Effingham**						Portsmouth	Harland & Wolff. T.	1921	1925	2,138,999				5 (1 sub.)		2150 / Oil	
" "	**Frobisher**	9750	565	65 0	17 3	70,000 (Hawkins 60,000)	Devonport	Wallsend Eng. Co. T.	1920	1924	2,035,915	† 3	Shields	7 *7·5-in.*, 3 *4-in.* A.A., 4 *3-pr.*, 2 *2-pr.* Pom Poms; 2 M.; 8 L.	6 (2 sub.)	30		743
" "	**Hawkins** *See p.* 415.						Chatham	Parsons Co. T. (G.)	1917	1919					6 (2 sub.)		800 / 1420	
P. L. Cr.	**Enterprise**	7550	535	54 6	16 6	80,000	Clydebank	John Brown T. (G.)	1919	..	1,690,658*	3–1½ / 1	..	7 *6-in.*, 3 *4-in.* A.A., 4 *3-pr.*, 2 *2-pr.* Pom Poms; 1 M.	12	33	1600 / Oil	577
" "	**Emerald** *See p.* 414.						Elswick	Armstrong T. (G.)	1920	..	1,474,235*							
A.C.	**Hermes**	10,950	548	‡70 3	18 7	40,000	Elswick	Parsons Co. T. (G.)	1919	1924	..	..	..	7 *5·5-in.*, 4 *4-in.* A.A. 4 *3-pr.*	..	25	2000 / Oil	568

Cr. . .	**Lowestoft** . . *See p.* 419.	5440	430	49	10	15	10	25,000	Chatham	Fairfield . T.	1913	1914	375,162	..	..	9 *6-in.*, 4 *3-pr.*, 1 *3-in.*, A.A., 2 M., 8 L.	2	25·5	1075 / 235	580
A. C. . .	**Pegasus** . . (late Stockholm)	3070	332	43	0	14	6	9,500 †	Clydeb'nk	J. Brown . B.C.T.(G.)	1917	1917	..	..	..	4 *12-pr.* (2 A.A.), 14 M.	Nil.	20·25	360 / Oil	182
Minelayer .	**Princess Margaret** .	5440	395½	54	0	16	6	15,000	Dumbarton. Purchased 1919	Denny .	1914 (Refitted 1921–22)	1914	..	..	..	2 *4-in.*, 2 *3-in.* A.A.	Nil.	22½	585 / Oil	233
Cr. . .	**Southampton** . *See p.* 419.	5400	430	49	10	15	9	25,000 Y.	Clydeb'nk	J. Brown . C.T.	1912	1913	336,469*	3 / —	..	8 *6-in.*, 1 *3-in.* A.A., 4 *3-pr.*, 2 M., 8 L.	2	25·5	1120 / 235	560
L. Cr. .	**Vindictive** . *ex* Cavendish *See p.* 415.	9750	565	65	0	20	4	60,000	Belfast	Harland & Wolff T.(G.)	1918	1918	..	..	..	6 *7·5 in.*, 3 *4-in.* A.A., 4 *3-pr.*, 2 *2-pr.* Pom Poms, 4 M., 8 L.	6 (2 sub)	29·12 ‡	800 / 1420	..
L. Cr. . .	**Weymouth**	5250	430	48	6	15	6	22,000 Y.	Elswick	Parsons . P. T.	1910	1911	337,738*	2¾	..	8 *6-in.*, 1 *12-pr.*, 1 *3-in.* A.A., 16 M.	2	25·5 ‡	1290 / 260	540
,, . . .	**Yarmouth** *See p.* 419.								Glasgow	London & Glas. Co. C. T.	1911	1912	353,238*							

* Total estimated cost of ship, including guns. † Estimated cost excluding armament and ordnance stores. ‡ Extreme breadth under water; 100 ft. over seaplane lifting rails.

There are a number of other vessels on the non-effective list which are being used for various purposes as repair ships, and other auxiliary work, including depôt ships for destroyers and submarines.

A programme of new construction has been approved for the years 1925–26 to 1929–30. This provides for four 10,000 ton cruisers in 1925–26, two in 1926–27, and one in each succeeding year up to 1929–30, making nine in all.

In addition there will be seven 8000 ton cruisers laid down, one in 1926–27, and two in each succeeding year up to 1929–30.

Of the four ships provided for in 1925–26, two will be laid down in October, 1925, and two in February, 1926.

In 1929–30 one aircraft carrier will also be laid down.

Defence Forces of the Dominions.

ROYAL AUSTRALIAN NAVY.

Class.	NAME.	Displacement.	Length.	Beam. (Extreme.)	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal. / Oil	Complement.
		tons.	ft.	ft. in.	ft. in.						£	in.	in.			knots	tons.	
Cr.	Kent Class (2 vessels)	—	—	—	—	—	Clyde Bank	—	Bldg.	..	.	..	..	..	..	..	..	..
L. Cr.	Adelaide	5550	430	49 10	15 10	25,000	Sydney	T.	1918	1922	..	..	..	9 *6-in.*, 4 *3-pr.*, 2 M. 1 *3-in.* A.A., 8 L.	2	25	860 / 500	450
,,	Melbourne						Birkenhead	Cammell Laird. T.	1912	1913							1148 / 271	390
,,	Sydney	5400	430	49 10	15 9	25,000	Glasgow	London & Glasgow Co. T.	1912	1913	..	3	..	8 *6-in.*, 4 *3-pr.*, 2 M., 1 *3-in.* A.A., 8 L.	2	25·5	1210 / 260	392
,,	Brisbane						Sydney	Vickers T.	1915	1916							1196 / 260	391
Flot. Ldr.	Anzac	1670	315	31 10	11 1	36,000	Dumbarton	Denny T.	1917	1917	..	..	..	4 *4-in.* Q.F., 2 *2-pr.* A.A 1 M., 4 L.	2	34	515 Oil	122

DESTROYERS.—"*River*" *Class* :—Huon, Parramatta, Swan, Torrens, Warrego, Yarra. Launched, 1910–15; Displacement, 700 tons; 10,900–11,300 H.P.; speed, 26·5–27 knots; armament, one 4-in, three 12-pdrs., three tubes.

"*S*" *Class* :—Stalwart, Success, Swordsman, Tasmania, Tattoo. Launched, 1918–19; Displacement, 1,075 tons; 27,000 H.P.; speed, 36 knots; armament, three 4-in., one 2-pdr., 6 tubes (4 21-in., 2 18-in.).

SUBMARINES.—Two new vessels building by Messrs. Vickers.

SLOOPS.—"*Flower*" *Class* :—Mallow, Marguerite, Geranium. Launched, 1915; Displacement, 1,250 tons; 2,000 H.P.; speed, 16·5 knots; armament, one 4·7-in., two 3-pr. A.A.

The Royal Australian Navy also includes the Cerberus, gunboat; Platypus, destroyer depôt ship; and certain armed patrol vessels taken up for the war service.

NEW ZEALAND NAVY.

LIGHT CRUISER—"*D*" *Class*:—Dunedin. Completed, 1919 (Elswick). Displacement, 4,750 tons; 40,000 H.P.; speed, 29 knots; armament, six 6-in., three 4-in. A.A., two M., two torpedo tubes; max. fuel, 1,050 tons oil; complement, 460.

EX-LIGHT CRUISER.—"*Pearl*" *Class*:—Philomel. (Training and Depôt-ship, Auckland.) Completed. 1892 (Devonport and Earle). Displacement, 2,575 tons; 7,500 H.P.: speed, 19 knots: armament, one 6-in., one 4-in., two 12-pr.; coal, 300 tons; original complement, 217.

NEWFOUNDLAND.

SLOOP.—"*Flower*" *Class*:—Lobelia. Completed 1916 (Simons). Displacement, 1,250 tons; 2,000 H.P.; speed, 16·5 knots; armament, two 4-in.

ROYAL CANADIAN NAVY.

LIGHT CRUISER.—"*Arethusa*" *Class*:—Aurora. Completed, 1914 (Devonport Dockyard and Parsons Co.). Displacement, 3,500 tons; 40,000 H.P.; speed, 29 knots; armament, two 6-in., six 4-in. Q.F., one 4-in. A.A., two M., four 21-in. tubes; oil, 729 tons; complement, 318.

DESTROYERS.—"*M*" *Class*:—Patrician and Patriot. Completed, 1916 (Thornycroft). Displacement, 1000 tons; 27,500 H.P.; speed, 35 knots; armament, three 4-in., one 2-pr., four 21-in. tubes; oil, 256 tons (radius of action, 1,510 at 15 knots).

SUBMARINES.—"*H*" *Class*:—CH 14, CH 15. Surface displacement, 364 tons, submerged, 434; surface H.P., 480, submerged, 320; surface speed, 13 knots, submerged, 11 knots; oil fuel, 14 tons; armament, four 21-in. tubes.

MINESWEEPERS.—Festubert and Ypres, stationed at Halifax; and Armenticres and Thiepval, stationed at Esquimalt.

The Royal Canadian Navy has no effective ships of the larger classes, the cruisers Niobe and Rainbow, which were lent for training purposes, being ordered in March, 1920, to be paid off for sale. The Stadacona is in service as depôt-ship at Halifax and the motor-vessel Naden as depôt-ship at Esquimalt.

SOUTH AFRICA.

SURVEYING SHIP.—"*Beaufort*" *Class*:—Protea (ex-Crozier). Twin-screw mine-sweeper, converted 1919. Displacement, 800 tons; 2,200 H.P.; speed, 16 knots; coal capacity, 181–185 tons; armament, one 3-pr. Transferred to South Africa, September, 1921.

TRAWLERS.—*Admiralty Type*:—Immortelle and Sonneblom (late Eden and Foyle). Armament, one 12-pr. Transferred to South Africa, September, 1921, for mine-sweeping instructional duties.

The gunboat Afrikander (late Tickler) is employed as depôt-ship at Simonstown.

ARGENTINE REPUBLIC.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Garibaldi	6840	328	59¾	24	13,384	Sestri Ponente	1895	1896	752,000	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 10 *6-in.*, 6 *4·7-in.*, 4 *2·2-in.*, 2 M.	2	19·9 *t*	1000	500
a.c.	General Belgrano	7069	328	59¾	24	13,000	Leghorn	1897	1899	696,700	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 14 *6-in.*, 2 *3-in.*, 4 *2·2-in.*, 2 L., 2 M.	..	20·1 *t*	1000	500
a.c.	General San Martin	6773	328	59¾	24	13,000	Leghorn	1896	1898	688,200	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	4 *8-in.*, 10 *6-in.*, 6 *4·7-in.*, 4 *2·2-in.*, 2 L., 2 M.	4	19·8	1100	500
b.	Moreno / Rivadavia (*See p.* 420.)	27940	585	95½	28	39,500 B. & W. Curtis t.	Camden, N.J. (N.Y.S.B.Co.) / Quincy, Mass.	1911	1914 / 1915	2,200,000	12–10 K.S.	3–2	9–6 K.S.	9 K.S.	12–9 K.S.	6 K.S.	12 *12-in.*, 12 *6-in.*, 16 *4-in.*, 8 smaller.	2 sub.	22 *t*	1600 / 4000	1046
a.c.	Pueyrredon	6840	328	59¾	24	13,000 B.	Sestri Ponente	1898	1901	782,000	6–3 H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 10 *6-in.*, 6 *4·7-in.*, 4 *2·2-in.*, 2 M.	..	20·1 *t*	1000	430

Moreno and Rivadavia being refitted in U.S.A.

The old coast-defence ironclads Libertad and Independencia, 2300 tons, completed at Birkenhead in 1892–93, carry two 9·4-in., four 4·7-in., and four 3-pr. guns.

Cruiser Buenos Aires (Elswick, 1895), 4780 tons, two 8-in., four 6-in., six 4·7 in., three T.T., 23·2 knots on trial; river gunboats Patria (1894), 1070 tons, two 4·7 in., eight smaller, five T.T., Paraná and Rosario (Elswick, 1909), 1000 tons, two 6-in. howitzers, six 12-pr., twelve smaller, 15 knots. For destroyers, see Flotilla Tables.

The training-ship (cruiser) Presidente Sarmiento, 2750 tons; also the old cruiser Nueve de Julio, 3570 tons, Elswick 1902, and several small gunboats and torpedo-gunboats. There are 14 transports and many auxiliaries and 18 additional have recently been acquired in Europe.

BRAZIL.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkheads.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s., t.	**Marshal Deodoro**	3162	267½	48	13¼	3400 D'A.	La Seyne	1898	1900	..	13¾–4 H.S.	1½	..	..	8 H.S.	3 H.S.	2 *9·4-in.*, 4 *4·7-in.*, 2 M., 4 *6-pr.*, 2 *1-pr.*	2 (sub.)	15·0	236	200
c.d.s., t.	**Marshal Floriano**							1899	1901												
b.	**Minas Geraes** *See p.* 421.	19,281	500	83	25	27,212 *t* B.&W.	Elswick	1908	1909	1,821,400	9–6–4 K.S.	2	9–6–4 K.S.	9	12–8 K.S.	9 K.S.	12 *12-in.*, 22 *4·7-in.*, 8 *3-pr.*, 2 *3-in.* A.A.	4	21·5 *t*	900 2400	900
b.	**São Paulo** *See p.* 421.	19,281	500	83	25	28,645 *t* B.&W.	Barrow	1909	1910	1,821,400	9–6–4 K.S.	2	9–6–4 K.S.	9 K.S.	12–8 K.S.	9 K.S.	12 *12-in.*, 22 *4·7-in.*, 8 *3-pr.*, 2 *3-in.* A.A.	4	21·5 *t*	900 2400	900

The Minas Geraes and São Paulo have been completely refitted at the Brooklyn Navy Yard (1917–1919).

LIGHT CRUISERS:—Bahia and Rio Grande do Sul, completed at Elswick, 1910, 3100 tons, ten 4·7-in., six 1·8-in. guns, 17,000 H.P., 27 knots; Barroso (Elswick, 1897), 3600 tons, six 6-in., four 4·7-in. guns, 20 knots; also the old crusier Republica, now a mine-layer. Four 12-knot river gunboats, Missões, Acre and two others (Poplar, 1907). Carlos Gomes, mine-layer (550 mines). Torpedo-gunboat Tymbira, fitted as mine-layer. Also river monitors Maranhao and Pernambuco, built at Rio de Janeiro.

According to reports a Naval Parliamentary Commission recommended that one 10,000 ton cruiser, five submarines, and five destroyers should be constructed to replace units which have lost their military value.

CHILE.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Belt.	Armour: Deck.	Armour: Side above Belt.	Armour: Bulkhead.	Armour: Gun Position: Heavy Guns.	Armour: Gun Position: Secondary.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Fuel: Coal. / Oil.	Complement.
		tons.	ft.	ft. ins.	ft. ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b	**Almirante Latorre** (*ex* Canada) *See p. 422.*	28,000	625	92 0	28 6	37,000 P. tur. Y 2	Elswick	1913	1915	..	9–4 A.I.	4–2½	4½	..	10	6	10 *14-in.*, 14 *6-in.*, 2 *3-in.* and smaller	4 sub.	23	3300 / 520	1000
s.c.	**O'Higgins**	8,500	412	62 9	22 0	16,000 B.	Elswick	1897	1898	..	7–5	2	..	..	7½–6	6	4 *8-in.*, 10 *6-in.*, 10 *12-pr.*, 10 *6-pr.*, 4 M.	3 (2 sub.)	21·5 *t*	1260	500
b.	**Capitan Prat**	6,900	328	60 9	22 9	12,000	La Seyne	1890	1893	391,000	12	3	4	..	10½	2	4 *9·4-in.* (Canet), 8 *4·7-in.* (Canet), 10 *6-pr.*, 14 smaller and M.	4	18·3 *t*	775	500
a.c.	**Esmeralda**	7,020	436	53 3	20 3	16,000	Elswick	1896	1897	..	6 H.S.	2	..	6 H.S.	4½ Shields	..	2 *8-in.*, 12 *6-in.*, 12 *12-pr.*, 2 *3-pr.*, 4 M.	2	22·8 *t*	1350	500

Capitan Prat reconstructed in 1909.

Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Deck.	Armour: Gun Position.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft. ins.	ft. ins.						in.	in.			knots.	tons.	
cr.	**Blanco Encalada**	4400	370	46 6	19 6	14,500	Elswick	1893	1894	..	4–1½	..	2 *8-in.*, 10 *6-in.*, 4 *12-pr.*, 8 *3-pr.*, 4 *1-pr.**	5	22·78 *t*	850	427
”	**Chacabuco**	4500	360	46 6	17 0	15,500	Elswick	1901	1903	..	4½–1¾	..	2 *6-in.*, 10 *4·7-in.*, 12 *1·8-in.*, 2 M., 1 l.	5	23·0	1000	400
”	**General Baquedano** (Training)	2330	240	45 9	18 0	1500 B.	Elswick	1898	1900	..	..	..	4 *4·7-in.*, 2 *12-pr.*, 2 *6-pr.*, 2 M., 1 l.	1	13·7 *t.*	300	302
”	**Ministro Zenteno**	3600	330½	43 9	16 9	6500	Elswick	1896	1898	..	..	..	8 *6-in.*, 10 *6-pr.*, 4 *1-pr.**	3	20·0*t*	800	280
”	**Presidente Errázuriz** (Training)	2047	268	35 9	19 6	5400	La Seyne	1890	1892	..	3½	..	4 *6-in.* (Canet), 2 *5-in.*, 4 *2·2-in.*, 6 M.	3	19·0	200	171

* Armstrong.

Transports: Maipo, 11,000 tons; Rancagua, 10,000 tons; Angamos, 5,000 tons. Sloops or patrol vessels: Orompello, Leucoton, Elicura, Colocolo, 500 tons; Yanez, Yelcho, Huemul, Condor, 100 to 250 tons.

DENMARK.—Armoured Ships.

Class.	NAME.	Displacement.	Length.		Beam.		Draught.		Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns	Armament. Torpedo Tubes.	Speed	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ins.	ft.	ins	ft.	ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s.,t.	**Herluf Trolle**	3595	271	9	49	6	16	6	4400 T.	Copenhagen	1899	1901	..	7–4 H.S.	3	..	..	7 H.S.	6 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 6 *14-pr.*, 2 *6-pr.*	3 (sub.)	16·0	250	250
c.d.s.,t.	**Niels Juel**	4100	295	0	53	6	15	9	5500	Copenhagen	1918	1923	..	8–4 K.S.	2	..	7	..	2 K.S.	10 *5·9-in.*, 3 *6-pr.*	2 (sub.)	17·0	250 / 240	250
c.d.s.,t.	**Olfert Fischer**	3650	271	9	50	6	16	9	4600	Copenhagen	1903	1905	..	7–4 K.S.	3	..	..	7 K.S.	6	2 *9·4-in.*, 4 *5·9-in.*, 6 *14-pr.*, 2 *6-pr.*	3 (sub.)	16·0	250	250
c.d.s.,t.	**Peder Skram**	3735	275	3	51	6	16	3	5400	Copenhagen	1908	1909	..	8–4 K.S.	2	..	..	7 K.S.	6 K.S.	2 *9·4-in.*, 4 *5·9-in.*, 10 *14-pr.*, 2 *1-pr.*	4	16·0	250	250
c.d.s.,t.	**Skjold**	2200	226	6	38	0	13	6	2400 T.	Copenhagen	1896	1899	..	10–3 H.S.	2	..	7	8	5½	1 *9·4-in.*, 3 *4·7-in.* (K.), 4 *6-pr.*	4	13·0	280	210

Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.				tons.	
3rd cl. cr.	**Geiser**	1280	232	34	11½	3600 T.	Copenhagen	1892	1893 1907	..	1½	..	2 *4·7-in.*, 4 *20-pr.*, 4 *6-pr.*	2	17·1 t	150	155
„	**Heimdal**	1313	232	34	11½	3100 T.	Copenhagen	1894	1896	..	1½	..	2 *4·7-in.*, 4 *20-pr.*, 4 *6-pr.*, 6 M.	2	17·5	150	155

Heimdal, used as cadets' training ship. Valkyrien (3020 tons), reconstructed 1913, training ship. Mine-layers Lossen, Hjælperen, Beskytteren, Minekran 1–6, Mining boats 1–10. Torpedo transport Slejpner. Fylla (ex-British sloop Asphodel), and 4 other fishery inspection cruisers. Groensund, submarine repair ship, Hekla, submarine depôt. Three surveying ships.

FRANCE.—Armoured Ships.

Class.	NAME. DATE FOR SCRAPPING.‡	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft. ins.	ft. ins.	ft. ins.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Bretagne . 1934 *See p.* 423.	23,177	544 6	88 6	29 0	29,000 N. tur.	Brest	1913	1915	2,589,439	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 18 *5·5-in.*, 4 *14-pr.* A.A.	4 (sub.)	20·0	2700 / 300	1167
b.	Condorcet. *See p.* 425.	18,600	475 9	84 7	27 0	22,500 N. tur.	St. Nazaire	1909	1911	2,165,200	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 12 *3-in.*, 2 *3-pr.*, 4 *14-pr.* A.A.	2 (sub.)	19·25 t	2100 / Coal.	690
b.	Courbet . 1930 *See p.* 424.	23,500	541 4	88 6	29 0	28,000 N. tur.	Lorient	1911	1913	2,508,388	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 4 *3-pr.*, 4 *14-pr.* A.A.	4 (sub.)	20·0	2450 / 250	998
b.	Diderot . *See p.* 425.	18,600	475 9	84 7	27 0	22,500 N. tur.	St. Nazaire	1909	1911	2,167,000	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾	4 *12-in.*, 12 *9·4-in.*, 12 *3-in.*, 2 *3-pr.*, 4 *14-pr.* A.A.	2 (sub.)	19·25 t	2100 / Coal.	690
a.c.	Edgar Quinet . *See p.* 427.	13,828	515 0	70 7	27 6	39,803 t B.	Brest	1907	1911	1,307,536	6½–3½ K.S.	2½–1¼	5–2 K.S	4¾ K.S.	8 K.S.	4¾ K.S.	14 *7·6-in.*, 10 *9-pr.*, and smaller	2 (sub.)	23·0 t	1900 / Coal.	738
a.c.	Ernest Renan . *See p.* 426.	13,500	515 0	70 0	27 6	37,500 Nic., t	St. Nazaire	1906	1909	1,410,000	6¾–4 H.S.	2	5–3 H.S.	4¾	6 H.S.	5 H.S.	4 *7·6-in.*, 12 *6·5-in.*, and smaller	2 (sub.)	23·0 t	2300 / Coal.	674
b.	Jean Bart . 1930 *See p.* 424.	23,500	541 4	88 6	29 0	28,000 B. tur.	Brest	1911	1913	2,528,888	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in*, 4 *3-pr.*, 4 *14-pr.* A.A.	4 (sub.)	20·0	2450 / 250	998
a.c.	Jules Ferry *See p.* 426.	12,351	487 0	70 3	27 0	30,500 Guyot	Cherbourg	1903	1906	1,169,940	6¾–4 H.S.	2	5–3 H.S.	6	6 H.S.	5 H.S.	4 *7·6-in.*, 14 *6·4-in.*, 24 smaller	2 (sub.)	22·0 t	1900 / Coal.	728
a.c.	Jules Michelet. *See p.* 426.	13,100	489 0	70 3	27 0	27,700 Guyot	Lorient	1905	1908	1,204,107	6–4 K.S.	2	5–3 K.S.	6 H.S.	8 K.S.	5 K.S.	4 *7·6-in.*, 12 *6·5-in.*, and smaller	2 (sub.)	22·0 t	2100 / Coal.	724

b.	**Lorraine** . 1936 *See p.* 423.	. 23,177	544 6	88 6	29 0	29,000 tur. S. & cyl.	St. Nazaire	1913	1916	2,642,439	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 18 *5·5-in.*, 4 *14-pr.* A.A.	4 (sub.)	20·0	2700 300	1167
b.	**Paris** . . 1934 *See p.* 424.	. 23,500	541 4	88 6	29 0	28,000 N. tur.	La Seyne .	1912	1914	2,603,920	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 *12-in.*, 22 *5·5-in.*, 4 *3-pr.*, 4 *14-pr.* A.A.	4 (sub.)	20·0	2450 250	998
b.	**Provence** . 1935 *See p.* 423.	. 23,177	544 6	88 6	29 0	29,000 tur.	Lorient .	1913	1915	2,589,000	11–7 K.S.	2¾–1¾	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 *13·4-in.*, 18 *5·5-in.*, 4 *14-pr.* A.A.	4 (sub.)	20·0	2700 300	1167
a.c.	**Victor Hugo** *See p.* 426.	. 13,108	480 6	70 3	27 0	28,486 *t.* B.	Lorient .	1904	1907	1,229,932	6¾–4 H.S.	2	5-3 H.S.	6	8 H.S.	5 H.S.	4 *7·6-in.*, 16 *6·4-in.*, 24 smaller	2 (sub.)	22·0 *t*	1900 Coal	728
b.	**Voltaire** . *See p.* 425.	. 18,600	475 9	84 7	27 0	22,500 B. tur.	La Seyne .	1909	1911	2,169,200	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 12 *3-in.*, 2 *3-pr.*, 4 *14-pr.* A.A.	2 (sub.)	19·25 *t*	2100 Coal.	690
a.c.	**Waldeck-Rousseau** *See p.* 427.	. 13,828	515 0	70 7	27 6	35,286 Nic. *t.*	Lorient .	1908	1911	1,301,380	6½–3½	2½	5	4¾	6	5½	14 *7·6-in.*, 10 *9-pr.*, and smaller	2 (sub.)	23·0 *t*	1900 Coal.	738

The battleship France, lost by striking a rock at Quiberon Bay, August 25, 1922, belonged to the Fleet authorised by the Treaty of Washington, but no provision has been made to replace her.
In the case of the battleships Condorcet, Diderot, and Voltaire, the date of scrapping has not been indicated.

The uncompleted battleship Béarn is being converted into an aircraft carrier at Toulon.
The armoured cruisers Condé, Gueydon, Marseillaise, Montcalm, and Jeanne d'Arc (1902-4) are retained temporarily as Training Ships.

FRANCE.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel.	Complement.
		tons.	ft.	ft. ins.	ft. ins.					£	in.	in.			knots.	tons.	
l. cr.	Tourville; Duquesne (See p. 428.)	10,000	607	62 4	19 6	120,000	Lorient; Brest; Projected	Bldg.	..	..	..	..	8 8-in., 8 2·9-in. A.A., 8 3-pr.; 2 seaplanes	2 triple	34–35	oil	
„	Colmar (ex-Kolberg) (See p. 432.)	4280	426½†	46 0	16 6	30,000 t (tur.)	Danzig (Schichau)	1908	1910	380,870	2 Deck.	2	6 5·9-in., 2 14-pr. (Rearmed 1916)	2	26·3 t	890 coal	379
„	Duguay-Trouin (See p. 429.)	8000	575	56 6	17 0	100,000	Brest	1923	1925	..	..	..	8 6-in., 6 l. & M.; 2 seaplanes; 4 2·9-in. A.A.	4 triple	34	oil	..
„	La Motte Picquet (See p. 429.)	8000	575	56 6	17 0	100,000	Lorient	1924	1925	..	..	..	8 6 in., 6 l. & M.; 2 seaplanes; 4 2·9-in. A.A.	4 triple	34	oil	..
„	Metz (ex-Königsberg) (See p. 430.)	5300	489†	47 0	16 6	40,000	Bremen (Weser)	1915	1916	..	2½	1	8 5·9-in., 2 2·9-in. A.A., 4 M.	2 sub. 2 aw.	27·5	1270 / 500	500
„	Mulhouse (ex-Stralsund) (See p. 431.)	4480	446½†	43 7	16 9	35,515 t (tur.)	Bremen (Weser)	1912	1913	416,340	4–2½	2	7 5·9-in., 2 2·9-in. A.A., 2 M. (Rearmed)	2 (sub.)	28·27 t	1200 / 130	378
„	Primauguet (See p. 429.)	8000	575	56 6	17 0	100,000	Brest	1924	1926	..	..	..	8 6-in., 6 l. & M.; 2 seaplanes; 4 2·9 in. A.A.	4 triple	34	oil	..
„	Strasbourg (ex-Regensburg) (See p. 430.)	4900	456†	45 0	17 0	30,000 (P. tur.)	Bremen (Weser)	1914	1914	417,810	4–2½	2	6 5·9-in., 2 2·9 in. A.A., 4 M. (Rearmed)	4 (sub.)	27·0	1200 / 380	373
„	Thionville (ex-Novara) (See p. 431.)	3500	410¾	42 0	15 6	25,000 (tur.)	Fiume	1913	1914	..	2½	..	9 3·9-in., 1 14-pr. A.A.	2 twin, 1 triple	27·0	800 coal	320

† Water-line.

Four 10,000 ton cruisers and one aircraft carrier projected. To be laid down between 1925 and 1929.

During the war, and subsequently, the following sloops, despatch vessels, and gunboats (350-1250 tons, 17-22 knots) have been built: Algol, Altaïr, Aldebaran, Antarès, Bellatrix, Cassiopée, Régulus, Quentin-Roosevelt, Dubordieu, Dumont d'Urville, Du Couëdic, Du Chaffault, Duperré, Ancre, Ailette, Arras, Bapaume, Escaut, Marne, Oise, Somme, Coucy, Nancy, Amiens, Aisne, Epernay, Lunéville, Péronne, Mondemart, Montmirail, Reims, Verdun, Belfort, Epinal, Vauquois, Vimy, Vitry-le-François, Les Eparges, Lassigny, Remiremont, Revigny, Calais, Craonne, Liévin, Baccarat, Béthune, Scarpe, Suippe, Yser, Tahure, Dunkerque, Toul, Ville d'Ys, Meuse, and Chamois. In this series the vessels bearing the names of stars are sloops, and carry two 5·5-in. and two 6-prs.; the gunboats named after old seamen, one 5·5-in. and one 3·9-in.; those named in honour of towns famed in the war, two 5·5-in., one 12-pr. and 2 M.; and those bearing the names of rivers known in the war, four 3·9-in. and five smaller. In addition are several older gun-vessels and 3 river gunboats built and two building. The despatch vessel Reims is completing.

Twenty-four mine-trawlers of the Belliqueuse type, and a large flotilla of mine-trawlers. Submarine chasers fifty-four (internal-combustion engines), fifteen (coal). Foudre, 5984 tons, repair ship.

Merchant Auxiliary Cruisers.—La France, 22,500 register tons, 23·5 knots, Touraine, 8429 register tons, 19·5 knots, Lorraine, 11,869 register tons, 21 knots, Savoie, 11,200 register tons, 22½ knots, of the Compagnie Générale Transatlantique, and some other vessels; also the Amazone, Magellan, Tonkin, and other 17 and 17½ knot boats of the Messageries Maritimes, and the Burdigala, 18 knots, and Lutetia, 20·5 knots, of the Sud Atlantique line.

GERMANY.

In the following list the letter **R** implies that the ships so marked are to be retained in reserve with their armament, but to have no ammunition on board.

Class.		NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt	Armour. Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Second-ary.	Armament. Guns. The *12-prs.* are field guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
			tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.		**Braunschweig**	12,997	398½	73½	24½	16,000 T.S. & C.	Germania	1902	1904	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 12 *6·7-in.*, 8 light and 23 machine	4 a.w.	18·0	700 / 1600	743
b.		**Elsass**	12,997	398½	72¾	24½	16,812 W.T.& C.	Danzig (Schichau)	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 10 *6·7-in.*, 8 light and 23 machine	4 a.w.	18·7	800 / 1600	743
b.		**Hannover**	13,040	398½	73¾	25¼	22,492 T.S. *t.*	Wilhelmshaven	1905	1907	1,157,500	9½–4 K.S.	3	8 K.S.	6 K.S.	10–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *6·7-in.*, 12 light and 23 machine	4 a.w.	19·16 *t*	700 / 1800	743
b.		**Hessen**	12,997	398½	73¾	24½	16,000 T.S. & C.	Kiel (Germania)	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 18 light and 23 machine	5 (1 sub. 4 a.w.)	18·0	800 / 1600	743
b.	**R**	**Lothringen**	12,997	398½	73¾	24½	16,950 W.T.&C.	Schichau (Danzig)	1904	1906	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 18 *3·4-in.*, 23 machine	5 (1 sub. 4 a.w.)	18·54 *t*	800 / 1600	743
b.	**R**	**Preussen**	12,997	398½	73¾	24½	18,374 W.T.& C.	Stettin	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 18 *3·4-in.*, 23 machine	5 (1 sub. 4 a.w.)	18·6 *t*	1574 / 1600	743
b.		**Schlesien**	13,040	398½	72¾	25¼	16,939 T.S. & C.	Schichau / Germania	1906	1908	1,214,000	9½–4 K.S.	3	8 K.S.	6 K.S.	11–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *5·9-in.*, 20 *3·4-in.*, 23 machine	5 (1 sub. 4 a.w.)	19·2 / 19·5 *t*	700 / 1800	743
b.		**Schleswig-Holstein**																				

The **Hannover** in the Baltic and the **Braunschweig** in the North Sea have been the only battleships in commission. The **Lothringen** and **Preussen** are out of the service.

Light cruisers **Medusa**, **Thetis**, and **Amazone** (2630 tons), completed 1901; **Arkona**, 1903; **Hamburg**, 1904; **Berlin**, 1905, all mounting ten *4·1-in.* guns. Also the **Nymphe** and **Niobe** (1899, 1901), these two to retain armament, but to have no ammunition on board. Both are now out of the service. The **Arkona**, **Hamburg**, and **Berlin** are alone considered to retain any real value, but nearly all the light vessels have been cruising. The light cruiser which is in hand at Wilhelmshaven, to replace an older vessel, is the **Emden**, 5600 tons, length 508 ft. 6 ins., beam 46 ft. 9 ins., draught 16 ft. 4 ins., 29,000 h.-p., 8 *6-in.*, 3 *22-pr.*, 4 T.T.

Surveying vessels **Meteor** and **Panther**. Gunboats **Drache**, **Fuchs**, **Hay**, **Delphin**.

GREECE.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	**Giorgios Averoff** *See p.* 433.	9956	429¾	69	24¾	20,000 B	Leghorn (Orlando)	1910	1911	1,100,000	8–3½ K.S.	1¾	7	7	8–6½	7	4 *9·2-in.*, 8 *7·5-in.*, 16 *3-in.*, 4 *3-pr.*, 1 *12-pr.* A.A.	3 (sub.)	24·0 *t.*	700 / 1600	..
b. *b.*	**Kilkis** (*ex* Mississippi) **Lemnos** (*ex* Idaho) *See p.* 433.	13,000	375	77	24¾	13,607 B.&W.	Phila-delphia	1905	1908	616,360	9–4 K.S.	3½–1 K.S.	7 K.S.	7 K.S.	10–7½ K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 8 *7-in.*, 12 *3-in.*, 14 smaller	2 (sub.)	17·1 *t.*	750 / 1820	725

The old battleships Hydra, Psara, and Spetsai are used in the training service.

GREECE.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	**Helle** (*ex* Fei-Hung)	2600	330	39	14	6500 tur.	Camden, N.J.	1912	1914	240,000	¾	..	2 *6-in.*, 4 *4-in.*, 4 *6-pr.*, 1 A.A.	2	20	600 / 100	..

Torpedo depôt-ship.—**Kanaris**, 1100 tons, 500 I.H.P., 2 3·9-in. (Krupp) guns, 14 knots speed. Mine-layers **Aigialia, Monemvasia, Naupactia, Myconos.** Five old gunboats and four corvettes. Three ex-British motor launches. Several armed merchantmen.

ITALY.—Armoured Ships.

Class.	NAME. Date for Scrapping.*	Displacement.	Length.		Beam.		Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ins.	ft.	ins.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Andrea Doria 1937	22,600	554	4	92	0	29	32,000 P. tur. Y.	Spezia	1913	1915	..	10–4 K.S.	1¾	6 K.S.	..	9½ K.S.	6 K.S.	13 *12-in.*, 16 *6-in.*, 13 *14-pr.*, 6 *14-pr.* A.A., 2 M., 4 L.	3 (sub.)	22	1200 / 800	1074
b.	Caio Duilio 1936 See p. 434.								Castellammare	1913	1915												
b.	Conte di Cavour 1936 See p. 435.	22,023	554	4	92	0	29	24,000 Parsons B. & W.	Spezia	1911	1915	..	10–4½ K.S.	1¾	6 K.S.	..	9½ K.S.	5 K.S.	13 *12-in.*, 18 *4·7-in.*, 13 *14-pr.*, 6 *14-pr.* H.A.	3 (sub.)	22·0	1300 / 850	999
b.	Dante Alighieri 1931 See p. 436.	19,400	519	8½	87	5	29	35,000*t* Parsons Bl.	Castellammare	1910	1912	..	9½–4½ K.S.	1½	6 K.S.	..	10 K.S.	4	12 *12-in.*, 20 *4·7-in.*, 12 *14-pr.*, 6 *14-pr.* H.A.	3 (2 sub.)	23·0 *t*	1300 / 750	900
b.	Giulio Cesare 1935 See p. 435.	22,023	554	4	92	0	28	24,000 P. B. & W. P. Bl.	Genoa (Ansaldo)	1911	1914	..	10–4½ K.S.	1¾	6 K.S.	..	9½ K.S.	5 K.S.	13 *12-in.*, 18 *4·7-in.*, 13 *14-pr.*, 6 *14-pr.* H.A.	3 (sub.)	22·0 *t*	1300 / 850	999
b.	Napoli	12,660	435	0	73	6	27½	20,000 B. & W.	Castellammare	1905	1909	1,120,000	9¾–4 H.S.	2	8 H.S.	8 H.S.	8 H.S.	6 H.S.	2 *12-in.*, 12 *8-in.*, 16 *14-pr.*, 2 *3-pr.*	2 (sub.)	22·0	2000 Coal	711
a.c.	Pisa See p. 437.	10,600	426	6	68	11	24¾	18,000 B.	Leghorn (Orlando)	1907	1908	..	8–3½ K.S.	1¾	7 K.S.	7 K.S.	8–6 K.S.	6¾	4 *10-in.*, 8 *7·5-in.*, 14 *14-pr.*, 6 *14-pr.* H.A.	3 (sub.)	23·0	1600 Coal	687
b.	Roma	12,660	435	0	73	6	27½	20,000 B. & W.	Spezia	1907	1909	1,120,000	9¾–4 H.S.	2	8 H.S.	8 H.S.	8 H.S.	6 H.S.	2 *12-in.*, 12 *8-in.*, 16 *14-pr.*, 2 *3-pr.*	2 (sub.)	22·0	2000 Coal	711
a.c.	San Giorgio	10,800	429	10	69	0	24¾	18000 Bl.	Castellammare	1908	1910	..	8–3½ K.S.	1¾	7 K.S.	7 K.S.	7–6 K.S.	7 K.S.	4 *10-in.*, 8 *7·5-in.*, 10 *14-pr.*, 6 *14-pr.* H.A.	3 (sub.)	22·5	1600 Coal	643
a.c.	San Marco See p. 437.	10,000						18000 tur.													23 0		

The Leonardo da Vinci, sister of the Giulio Cesare, was raised and taken into dock with the intention of reconstruction, but there is now no intention to complete her for service. She has been removed from the Italian Navy List. The old battleships Regina Elena and Vittorio Emanuele have also been removed, but the Napoli and Roma of the same class remain. The old armoured cruiser Francesco Ferruccio is now employed for the training of cadets. Monitor Faa di Bruno, 2,809 tons, 2 *15-in.*, 4 *14-pr.*, A.A. There are also four small river monitors, Monte Cengio, Monte Rovegno, Monte Grappa, and Montello, 575 tons, one *15-in.*, one machine-gun.

In the case of the Napoli and Roma the date of scrapping under the Treaty of Washington has not been indicated.

ITALY.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Side. / Deck.	Armour. Gun Position.	Armaments. Guns.	Armaments. Torpedo Tubes.	Speed.	Fuel.	Complement.
		tons.	ft. ins.	ft. ins.	ft.					£	in.	in.			knots.	tons.	
l. cr.	Trieste, Trento. See p. 438.	10,000	640 9†	67 7	18¾	140,000	..	Bldg.	..	..	..	..	8 8-in., 12 4-in. A.A., 2 sea-planes	4 (twin)	35–36	..	..
„	Ancona (ex German Graudenz) See p. 441.	4842	456 0	45 0	17	27,400	Kiel	1913	1914	..	4–2½ / 1	.	7 5·9-in., 2 22-pr. A.A., 120 mines	4 (2sub.)	27·5	1279	364
Scout	Aquila	1550	310 0	31 0	10½	40,000	Naples (Pattison)	1915	1916	..	..	..	4 4·7-in., 4 14-pr. A.A., carries 50 mines	4	35·0	260 Oil.	160
„	Augusto Riboty	1800	331 0	32 0	10½	43,100	Genoa (Ansaldo)	1915	1916	..	..	..	8 4-in., 2 2-pr. A.A.; carries 100 mines	4	35·0	350 Oil.	160
l. cr.	Bari (ex-German Pillau) See p. 439.	4320	441 0†	46 0	19½	27,400 turb.	Danzig (Schichau)	1914	1914	..	— / 1½–¾	1	8 5·9-in., 3 3-in. A.A. (Re-armed). Can carry 120 mines.	2	27·5	1000	372
„	Brindisi (ex-Austrian Helgoland) See p. 440.	3440	416 9	42 0	15½	25,000 Tur.	Fiume	1912	1914	..	2½ / ¾	..	9 3·9-in., 1 3-in. A.A	6	27·0	450 750	320
„	Campania	2444	250 6	41 6	14·6	5000	Castellammare	1914	1916	..	1	..	6 6-in., 2 14-pr., 2 3-in. A.A., 5 l., 2 M.	2	17·0	700	240
Scout	Carlo Mirabello	1800	331 0	32 0	10½	43,100	Genoa (Ansaldo)	1914	1916	..	..	..	8 4-in., 2 2-pr. A.A.; carries 100 mines	4	35·0	350 Oil.	160
„	Falco	1550	310 0	31 0	10½	38,100	Naples (Pattison)	1917	1918	..	..	..	5 4.7-in., 4 14-pr. A.A.; carries 50 mines	2 dbl.	35·0	260 Oil.	160
„	Leone	2165	359 6	33 6	11¼	50,000 turb.	Genoa (Ansaldo)	1923	1924	..	..	..	8 4·7-in., 2 14-pr. A.A., 2 M.; mining equipment	6	35·0	400 Oil.	..
l. cr.	Libia	4000	341 6	47 6	16	12,500	Genoa (Ansaldo)	1912	1913	..	— / 1½	..	8 4·7-in., 6 smaller	2	22·0	630 Coal.	300
„	Marsala. See p. 440.	3600	430 0	42 0	13¼	22,500 P.tur.Bl	Castellammare	1912	1914	..	— / 1½–¾	..	6 4·7-in. and 6 14-pr., 2 2-pr. A.A., 150 mines	2	28·0	800	240
A.c.	Miraglia	5000	377 0	49 0	17	12,000	Spezia	1923	Bldg.	..	..	..	6 3 in. or 4-in. A.A	..	21·5	..	..

† Water line.

l. cr.	**Nino Bixio** *See p. 440.*	3600	430	0	42	9	13¼	22,500 Bl.Cur.t.	Castellammare	1911	1914	..	— / 1½–¾	..	6 *4·7-in.* and 6 *14-pr.*, 2 *2-pr.* A.A., 150 mines	2	28·0	800	300
Scout	**Pantera**	2165	359	6	33	6	11½	50,000 turb.	Genoa (Ansaldo)	1924	1925	..	..	..	8 *4·7-in.*, 2 *14-pr.* A.A., 2 M., mining equipment	6	35·0	400 / Oil.	100
„	**Premuda** (*ex* German V. 116)	2500	334	6	36	0	14	45,000 approx.	Hamburg	1918	1919	..	..	..	4 *5·9-in.*, 2 *14-pr.* A.A.	4 *23·6 in.*	35·0	720 Oil.	..
l. cr.	**Quarto** *See p. 441.*	3220	413	6	43	9	13¼	29,000 P.tur.Bl.	Venice	1911	1912	..	— / 1½–¾	..	6 *4·7-in.* and 6 *14-pr.*, 2 *2-pr.* A.A., 150 mines	2	28·0	450	240
l. cr.	**Taranto** (*ex*-German Strassburg) *See p. 439.*	4480	446	3†	43	6	15⅝	25,650 *t* P. tur.	Wilhelmshaven	1912	1912	416,340	4–2½ / —	2	7 *5·9-in.*, 2 *3-in.* A.A., 2 M. (Rearmed). Can carry 120 mines.	2 (sub.)	26·9 *t*	1200	373
Scout	**Tigre**	2165	359	6	33	6	11½	50,000 turb.	Genoa (Ansaldo)	1924	1925	..	..	8	8 *4·7-in.*, 2 *14-pr.* A.A., 2 M., mining equipment	6	35·0	400 / Oil.	..
l. cr.	**Venezia** (*ex*-Austrian Saida) *See p. 440.*	3440	416	9	42	0	15½	25,000 Tur.	Monfalcone	1912	1914	..	2½ / ¼	..	9 *3·9-in.*, 1 *3-in.* A.A.	6	27·0	450 / 850	320

Two 10,000 ton cruisers (1924–25) programme to be laid down this year.
Four others are projected in the 1925–26 programme.
The scouts have been built to act also as flotilla leaders.
Etna (3474 tons), converted into a training ship. Eight mine-layers under construction, 600 tons, 10 knots, 200 mines: Albona, Laurana, Rovigno, ex-M. 130, 131, 132; Brondolo, Marghera, 115 tons, 13 knots. Nine mine-sweepers. Coal and liquid fuel transport Bronte (9490 tons); also Tevere, Prometeo, Cocito, Lete, Stige, Niobe, Cerrere, Istria, Dalmazia; building Tarvisio, Quarnero. Oil transport with under-water protection, Brennero. Anteo, submarine salvage vessel, 21,000 tons, 6 knots, raising 400 tons. Lagoon and river gunboats, Confida, Castore, Monte Santo, Vespa, Vodice, Ape, Cucco, Pasubio, Boeo, Cirenaica, Palmaiola, Toselli, Arimondi, S. Caboto, Alula, Calabria, E. Carlotto. Escort gunboats, A. Bafile, T. Farinati, E. Giovannini, C. del Greco, A. Vitturi. Surveying vessel, Ammiraglio Magnaghi, 1800 tons, 14 knots. About 50 various patrolling vessels and 10 gunboats. During the war a great number of motor chasers (M.A.S.) were bought and built, and at the beginning of 1921 about 350 of these were still on the list, but many have since been scrapped and sold. Transports Bengasi, Eritrea, Garigliano.

† Water line.

JAPAN.—Armoured Ships.

From this list the ships to be scrapped under the Washington Treaty, both those built and building, have been removed with one exception as a record.

Class.	NAME. DATE FOR SCRAPPING.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.†
		tons.	ft. ins.	ft. ins.	ft. ins.						in.	in.	in.	in.	in.	in.			knots.	tons.	
A.c.	**Akagi**	33,000	850 0	103 0	30 0	170,000 (G.)	Kure	1925	Bldg.	..	..	..	..	..	..	..	Reported stowage for from 50–70 aircraft	..	33·0	..	..
b.	**Fuso** * 1937 *See p.* 444.	30,600	630 0	94 0	28 6	40,000 tur.	Kure	1914	1915	..	12 K.S.	3	8 K.S.	..	12 K.S.	6 K.S.	12 *14-in.*, 16 *6-in.*, 4 *12-pr.* A.A.	6 (sub.)	22·5	4000 / 1000	1193
b.	**Hyuga** * 1940 *See p.* 442.	31,260	640 0	94 0	28 6	45,000 tur.	Nagasaki (Mitsubishi)	1917	1918								12 *14-in.*, 20 *5·5-in.*, 4 *12-pr.* A.A.	6 (sub.)	23·0	4000 / 1000	1360
b.c.	**Haruna** * 1935	27,500	653 6	92 6	27 0	64,000 My. P. t. My. C. t.	Kobe (Kawasaki)	1913	1915	..	8–3 K.S.	2¾	6	..	10 K.S.	6 K.S.	8 *14-in.*, 16 *6-in.*, 4 *12-pr.*, A.A.	8 (sub.)	27·5	4000 / 1000	980
"	**Hiyei** * 1935 *See p.* 445.			92 0	27 6		Yokosuka	1912	1914												
b.	**Ise** * 1939 *See p.* 442.	31,260	640 0	94 0	28 6	45,000 P. tur.	Kobe (Kawasaki)	1916	1917	..	12 K.S.	3	8 K.S.	..	12 K.S.	6 K.S.	12 *14-in.*, 20 *5·5-in.*, 4 *12-pr.* A.A.	6 (sub.)	23·0	4000 / 1000	1360
A.c.	**Kaga**	27,000	700 0	100 0	28 0	60,000	Kobe (Kawasaki)	1921	Bldg.	..	14 K.S.	..	..	..	..	..	..	8	27·0	..	..

† The complements of Japanese ships vary considerably from time to time. Those given are according to the latest reports.

b.c.	**Kirishima** * . 1936 *See p.* 445.	27,500	653	6	92	6	27	0	64,000 My.P.t.	Nagasaki . (Mitsubishi)	1913	1915	..	8–3 K.S.	2¾	6	..	10 K.S.	6 K.S.	8 *14-in.*, 16 *6-in.*, 4 *12-pr.*, A.A.	8 (sub.)	27·5	4000 / 1000	980
„	**Kongo** * . 1934 *See p.* 445.	27,500	653	6	92	0	27	6	64,000 Y. P. t.	Barrow .	1913	1913	2,500,000	8–3 K.S.	2¾	6	..	10 K.S.	6 K.S.	8 *14-in.*, 16 *6-in.*, 4 *12-pr.*, A.A.	8 (sub.)	27·5	4000 / 1000	980
b.	**Mutsu** . 1942	33,800	660	6	95	0	30	0	46,000 G.	Yokosuka	1920	1921	..	12 K.S.	..	..	..	..	..	8 *16-in.*, 20 *5·5-in.*, 4 *12-pr.* A.A.	8 (4 sub.)	23·0	5500 Coal & Oil	1336
b.	**Nagato** . 1941 *See p.* 442.									Kure .	1919	1920												
b.	**Yamashiro** * . 1938 *See p.* 444.	30,600	630	0	94	0	28	6	40,000 tur.	Yokosuka .	1915	1917	..	12 K.S.	3	8 K.S.	..	12 K.S.	6 K.S.	12 *14-in.*, 16 *6-in.*, 4 *12 pr.* A.A.	6 (sub.)	22·5	4000 / 1000	1193

The battleship Aso (*ex*-Bayan), 8100 tons, completed at La Seyne in 1908, is now classed as a mine-layer.
The armoured-cruisers Kasuga and Nisshin, 7630 tons, and the cruisers Asama, Adzuma, Idzumo, Iwate, and Yakumo, were classified as coast-defence ships.
The battleships and armoured-cruisers (classified as battle-cruisers in the Appendix to the Washington Treaty), are being scrapped under the Washington Treaty.

* These vessels, as funds permit, will be taken in hand for the installation of anti-submarine and anti-aircraft protection. It is also reported that they will be fitted to carry aeroplanes.

JAPAN.—Cruising Ships, &c.

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost	Armour. Side. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	Myoko	10,000	..	..	..	..	Yokosuka	Bldg.	..	..	..	..	8 or 10 *8-in.*	..	..	..	..
„	Nachi						Kure										
l.cr.	Aoba	7100	580	50¾	..	100,000	Nagasaki	1925	..	..	..	..	6 *8-in.*, 3 *12-pr.* A.A.	8	33	..	..
„	Furutaka						Uraga										
„	Kako						Kawasaki										
„	Kinugasa						Kawasaki										
„	Chikuma	4950	440	46½	16¾	22,500 Cur. t. My.	Sasebo	1911	1912	..	2¼	..	8 *6-in.*, 4 *3-in.*, 4 M.	3	26	500 / 1000	413
„	Hirado	4950	440	46½	16¾	22,500 P. tur. My.	Kobe	1911	1912	..	2¼	.	8 *6-in.*, 4 *3-in.*, 4 M.	3	26	500 / 1000	390
A.c.	Hosho	9500	510	62	20¼	30,000 (G.)	Tsurumi (Asano)	1921	1922	..	..	..	4 *5·5-in.*, 2 *12-pr.* A.A.	..	25	..	..
l.cr.	Abukama	5570	500	46¾	15¾	90,000	Uraga	1922	1925	..	2 / —	..	7 *5·5-in.*, 3 *12-pr.* A.A., 2 M.	8	33·0	..	450
„	Isudzu						Uraga	1921	1923								
„	Jintsu						Kawasaki	1923	1924								
„	Kinu						Kawasaki	1921	1922								
„	Naka * *See p. 447.*						Yokohama	1925	..								
„	Kiso *See p. 447.*	5500	500	46¾	15¾	90,000 (G.)	Nagasaki	1919	1921	..	2 / —	..	7 *5·5-in.*, 3 *12-pr.* A.A., 2 M.	8	33·0	..	439
„	Kitakami *See p. 447.*						Sasebo	1920	1921								
„	Kuma *See p. 447.*						Sasebo	1919	1920								
p.v.	Mogami	1350	300	31½	9¾	8000 turbines	Nagasaki	1908	1909	..	..	..	2 *4·7-in.*, 4 *12-pr.*	2	23·0	95 / 350	167
l.cr.	Nagara	5570	500	46¾	15¾	90,000 (G.)	Sasebo	1921	1922	..	2 / —	..	7 *5·5-in.*, 3 *12-pr.* A.A., 2 M.	8	33·0	..	439
„	Natori *See p. 447.*						Nagasaki (Mitsubishi)	1922	1922								

* Completion delayed by damage caused by earthquake in 1923.

„	**Oh-I** . . . . *See p.* 447.	5500	500	46¾	15¾	90,000 (G.)	Kobe . .	1920	1921	..	2	..	7 *5·5-in.*, 3 *12-pr.* A.A., 2 M.	8	33·0	..	439
„	**Sendai** . . . *See p.* 447.	5570	500	46¾	15¾	90,000	Nagasaki . . (Mitsubishi)	1923	1924	..	2/—	..	7 *5·5-in.*, 3 *12-pr.* A.A., 2 M. .	8	33·0	..	450
„	**Tama** . . . *See p.* 447.	5500	500	46¾	15¾	90,000 (G.)	Nagasaki . . (Mitsubishi)	1920	1921	..	2	..	7 *5·5-in.*, 3 *12-pr.* A.A., 2 M. .	8	33	..	439
„	**Tatsuta** . .	3500	440	41	13	51,000 (G.)	Sasebo .	1918	1919	..	..	..	4 *5·5-in.*, 1 *12-pr.* H.A., 2 M. .	6	33	..	322
„	**Tenryu** . . *See p.* 447.						Yokosuka										
„	**Tone**	4100	400	47	16¾	15,000 My	Sasebo . .	1907	1909	..	2½	..	2 *6-in.*, 10 *4·7-in.*, 2 *12-pr.*, 2 l.	3	23·0	300 / 900	401
l. cr.	**Yahagi** . . .	4950	440	46½	16¾	22,500 P. tur. My.	Nagasaki . .	1911	1912	..	2¼	..	8 *6-in.*, 4 *3-in.*, 4 M. . .	3	26	500 / 1000	413
p.v.	**Yodo**	1250	280	32	9¾	6500	Kobe . .	1907	1908	..	..	..	2 *4·7-in.*, 4 *12-pr.* . .	2	22·0	125 / 340	166
l. cr.	**Yubari** . . *See p.* 446.	3100	435	39½	11¾	55,000 (Estimated.)	Sasebo . .	1923	1923	..	..	..	6 *5·5-in*, 1 *12-pr.* A.A., 2 M. .	4	33	..	328
l. cr.	**Yura** . . . *See p.* 447.	5570	500	46¾	15¾	90,000 (G.)	Sasebo . .	1922	1923	..	2	..	7 *5·5-in.*, 3 *12-pr.* A.A., 2 M. .	8	33	..	450

Two additional 10,000 ton cruisers of Nachi type will probably be laid down this year.

Submarine depôt ships Karasaki (*ex*-Ekaterinoslav), 6170 tons, 5 light guns; Komahasi and Nagaura Maru. Seaplane carrier Wakamiya, 5870 tons. Aircraft carrier Hosho (details above); also the ex-battle-cruisers Akagi and Kaga to be converted into aircraft carriers (see table of armoured ships).

Repair ship Kwanto Maru, 10,000 tons. Colliers: Noshima, Maroto. Oil ships: 15,400 tons, Erimo, Notori, Shiretoko, Sunesaki Maru, Tsurugisaki, Namiya, Ondo, Iro, Tourumi, Sata, Shiriya, Hagatoma.

Gunboats Saga, 780 tons, Uji, 620 tons.

River gunboats Toba, 250 tons; Fushimi, 180 tons; Sumida, 126 tons; Ataka, 850 tons, two 4·7-in. guns, and 2 M.; also Katata, Hira, Hodzu, and Seta, 340 tons, completed 1923. Two 55-ft. C.M.B.'s with two 18-in. torpedoes. About 20 auxiliaries.

NETHERLANDS.

Class.	Name.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots	tons.	
a.g.b.	Brinio . . .																				
,,	Friso . . .	540	171	28	9¼	1200	Amsterdam .	1912 1913	1915	..	2 K.S.	¾	..	..	..	..	4 *4·1-in.* semi-automatic, 2 M.	..	14·5	34 Oil	52
,,	Gruno . . .																				
o.d.s.	De Ruyter . . *See p. 448.*	5000	316¾	51½	19	6377 *t.*	Rotterdam .	1901	1904	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 6 *5·9-in.*, 4 *2·9-in.*, 4 *1·4-in.*	3 2 sub.	14·5 *t*	830	347
,,	Hertog Hendrik . *See p. 448.*	5000	316¾	50	19	6282 *t.*	Amsterdam .	1902	1903	347,500	6 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 6 *5·9-in.*, 4 *2·9-in.*, 4 *1·4-in.*, 2 M.	3	14·5	830	347
,,	Jacob van Heemskerck	4921	316¾	50	19	6396 *t.*	Amsterdam .	1906	1908	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	6 H.N.S.	2 *9·4-in.*, 6 *5·9-in.*, 6 *2·9-in.*, 4 *1·4-in.*, 2 l.	2 1 sub	14·5	610	351
l. cr.	Java . . .	7000	509½	52½	18	65,000	Flushing .	1921	1924	..	3	..	..	..	..	..	10 5·9-*in.*, 4 13-*pr.* A.A., 4 M.	—	30	1050 Oil	—
,,	Sumatra . . .						Amsterdam	1920	—												
,,	Marten Tromp . *See p. 448.*	5216	330	50	18¾	6405 *t*	Amsterdam .	1904	1906	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 8 *2·9-in.*, 4 *1·4-in.*, 2 M.	3 2 sub.	14·5 *t*	830	349
,,	De Zeven Provincien	6426	389½	56	20¼	8516 Y	Amsterdam .	1909	1910	..	6–4 K.S	2	..	..	10 K.S.	4 K.S.	2 *11-in.*, 4 *5·9-in.*, 10 *2·9-in.* semi-auto., 2 M.	..	15·3	1030	409

The Zeven Provincien is assigned to the Fleet of the Dutch East Indies. Light cruisers: Gelderland (1900), 4030 tons, now used as gunnery school; Zeeland (1897), 3900 tons, two 5·9-in., eight 4·7-in, two 2·9-in., four 1·4-in., 2 M., 19·4 knots. Four gunboats for the defence of the Zuyderzee. There are modern mine-layers, Medusa, Hydra, and Mataram, and Van Meerlant and Douwe Aukes, 750 tons, three 2·9-in. semi-auto., completed 1922; two others, Havik and Vulcanus, and six old vessels converted to the same use. Four mine-sweepers (I.–IV.), 275–300 tons, 1 machine-gun. In 1923 two old gunboats are in commission in the East Indies, and there are four mine-layers, Assahan, Serdang, Siboga, and Hercules. Surveying vessels in the East Indies, Van Gogh, Van Doorn, Lombok, Sumbawa, Tydeman. Depôt ship for submarines (Pelikaan), 2487 tons, four 2·9-in. semi-auto., 3 M., 1400 H P. (electic drive), speed 12 knots, completed August, 1922 (East Indies).

NORWAY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Belt.	Armour: Deck.	Armour: Side above Belt.	Armour: Bulkhead.	Gun Position: Heavy Guns.	Gun Position: Secondary.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			in.	in.			knots.	tons.	
c.d.s.	{Eidsvold . / Norge . } *See p.* 448.	4233	290	$50\frac{1}{2}$	$16\frac{1}{2}$	4500 Y.	Elswick	1900	1901	350,000	6 H.N.S.	2	..	..	6 H.N.S.	6 H.N.S.	2 *8·2-in.* 6 *6-in.*, 8 *12-pr.*, 6 *3-pr.*	2 sub.	16·9 *t*	400 / 600	270
”	Harald Haarfagre .	3920	280	$48\frac{1}{2}$	$16\frac{1}{2}$	3700	Elswick	1896	1898	300,000	7 H.S.	2	..	..	8 H.S.	..	2 *8-in.*, 6 *4·7-in.*, 6 *12-pr.*, 6 *1½-pr.*	2 sub.	17·2 *t*	200 / 500	249
”	Tordenskjold							1897	1899												

Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Deck.	Armour: Gun Position.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
g.b	Ægger .	387	$108\frac{1}{2}$	$29\frac{1}{2}$	8	450	Horten	1892	1893	..	$1\frac{1}{2}$	..	1 *8·2-in.*, 1 *2·7-in.*, 2 *1·9-in.*	..	9·0	..	43
g.b.	Frithjof (training)	1349	$216\frac{1}{2}$	$32\frac{3}{4}$	$13\frac{1}{4}$	2800	Horten	1896	1898	..	..	..	2 *4·7-in.*, 6 *12-pr.*, 4 *1·4-in.*, 2 l.	3 sub.	15·0	120	166

Mine-layers Fröya (1916), 760 tons, 22 knots, 100 mines; Glommen and Laugen (1916), 350 tons, 10 knots, 50 mines; seven old gunboats refitted as minelayers, 280 tons. Submarine depôt and repair ships Sarpen, refitted 1918, 1920 tons; Ellida, 1000 tons. Two oil transports.

RUSSIA—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. Oil.	Complement.
		tons.	ft.	ft.	ft.							in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Pariskaia Kommuna	.3,000	594	87	27½	42,000	Baltic Works	Baltic Works	1911	1915	..	9–5	3	..	..	12–10	6	12 *12-in.*, 16 *4·7 in*, 2 *9-pr.* A.A., 1 *3-pr.*	4	23	3000	—
b.	Marat	23,000	594	87	27½	42,000			1911	1914												
b.	General Alexieff	22,600	510	89	27	26,500	..	..	1914	1917	..	12–4	3–1½	9–3	..	12–8	5	12 *12-in.*, 18 *5-in.*, 16 smaller, light and M.	4	21	1200 / 720	—
b.	Demokratiya†	..	..	..	..	27,300	..	..	Bldg.		..	..	..	..	..	.	..	12 *12-in.*, 20 *5·1-in.*, 12 smaller	4	..	..	—

† Building stopped. Not likely to be completed.

Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes	Speed.	Fuel.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
	Admiral Butakov† / Admiral Grieg / Admiral Spiraidov	6800	507¾	50⅓	18⅓	50,000	Reval (towed to Petrograd)	Bldg. / Bldg. / Bldg.	..	..	3/1	3	15 *5·1-in.*, 4 *4-in.* A.A., 4 *3-in.*, 4 M. Can carry mines.	2	29½	1170 Coal & oil	..
	Aurora	6730	..	..	..	11,600	..	..	1903	..	..	..	14 *6-in.*, 7 smaller	..	20	..	..
	Almaz*	3300	363	43½	17½	7,500	..	1903	1905	..	—/3	..	7 *4·7-in.*, 2 smaller	..	19	650 coal	..
	Chevonaya-Ukrainia	7600	507	49½	18½	55,000	..	1915	1923	..	..	..	15 *5·1-in.*, 4 *9-pr.* A.A., 4 smaller. Fitted to carry 100 mines	2	29½	..	..
	General Kornilov* / Komintern	6675	436	54	20½	19,500	..	..	1907	..	..	..	16 *6-in.*, 22 smaller	2	23	..	..
	Lazarev†	7600	507	49½	18½	55,000	..	Bldg.	..	..	3/1	3	15 *5·1-in.*, 4 *4-in.* A.A., 4 *3-in.*, 4 M. Fitted to carry 100 mines	2	29½	.	..
	Rurik ‖	15190	..	.	..	19,700	..	..	1908	..	..	..	4 *10-in.*, 8 *8-in.*, 20 *4-in.*, 5 smaller	2	21	..	..
	Svietlana	6800	507¾	50⅓	18⅓	50,000	..	1915	1924	..	3/1	3	15 *5·1-in.*, 4 *4-in.* A.A., 4 *3-in.*, 4 M. Fitted to carry mines	2	29½	..	.

* Reported to be partially disarmed At present at Bizerta and about to be handed over to Soviet Government. ‖ Will probably be scrapped. † Reports on these ships are conflicting. The *Lazarev* may be completed during 1925. The others may be converted into tankers.

SPAIN.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Alfonso XIII.** See p. 449.	15,500	435	78¾	25½	15,500Y. P. tur.	Ferrol	1913	1916	..	9–4 K.S.	2–1	6–5 K.S.	6–3 K.S.	10 K.S.	3 K.	8 *12-in.*, 20 *4-in.*, 2 *3-pr.*, 2 l., 2 M.	..	19·5	1850	735
a.c.	**Cataluña**	7405	347¾	61	23¼	10,580	Cartagena	1900	1908	600,000	12–10	2	..	12	10½	..	2 9 *4-in.*, 8 *5·5-in.*, 8 *6-pr.*, 2 l., 10 *1-pr.*	..	18 t	1178	546
”	**Emperador Carlos V.** See p. 449.	9900	404	67	27½	15,000	Cadiz (Vea Murguia)	1895	1898	734,000	2	6½–2	2	..	10	2	2 *11-in.* (Hontoria), 8 *5·5-in.*, 4 *4·1-in.*, 10 *6-pr.*, 8 *1-pr.*, 2 M., 2 l.	2	19·0	2008	583
b.	**España** *	15,460	435	78¾	25½	15,500Y. P. tur.	Ferrol	1912	1913	..	9–4 K.S.	2–1	6–5 K.S.	6–3 K.S.	10 K.S.	3 K.	8 *12-in.*, 20 *4-in.*, 2 *12-pr.*, 2 *3-pr.*, 2 M.	..	20·0 t	1305	700
b.	**Jaime I.** See p. 449.	15,700	435					1914	1915										20·2	1850	
a.c.	**Princesa de Asturias**	7427	347¾	61	23¾	11,791	Cadiz	1896	1902	600,000	12–10	2	..	12	10½	..	2 9·*4-in.*, 8 *5·5-in.*, 8 *6-pr.*, 2 l., 10 *1-pr.*	..	18·0	1007	546

* In September, 1923, the España went ashore at Cape Tres Forcas. She was lightened, but unexpected difficulties occurred, and a Liverpool firm was called in to assist in salving the vessel. It is understood that owing to damage by heavy weather the attempt at salving has been abandoned.

SPAIN.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost	Armour. Side. / Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	ins.				knots.	tons.	
l. cr.	Almirante Cervera. *See p. 450.*	7850	545	54½	16½	80,000	Ferrol	Bld.	—	..	3 / —	..	8 *6-in.*, 4 *4-in.* A.A., 2 *3-pr.*	12	33 0	oil	560
g.b.	Bonifaz	787	213	30	9½	1100 Y	Cartagena	1911	1912	..	..	..	4 *14-pr.*, 2 M.	..	14·0	148	121
to.g.b.	Don Alvaro de Bazán	810	236	27	11¼	3577	Ferrol	1897	1899	..	..	..	6 *6-pr.* } 2 *2½-pr.*, 2 M.	..	19·0	168	121
„	Doña María de Molina	810	236	27	11¼	3500	Ferrol	1896	1898				8 *6-pr.* }				
l. cr.	Extremadura	2100	288	36	16¼	7000 T	Cadiz	1900	1902	..	— / 2	..	8 *4-in.* (Vickers), 4 *6-pr.*, 4 *1-pr.*	..	19·0	425	266
g.b.	Lauria	787	213	30	9½	1100 Y	Cartagena	1911	1912	..	..	..	4 *3-in.*, 2 M.	..	14·0	..	121
„	Laya								1911								
to.g.b.	Marqués de la Victoria	810	233	26¾	11	2711	Ferrol	1897	1900	..	..	..	8 *6-pr.*, 2 M.	..	19·0	..	121
l. cr.	Principe Alfonso *See p. 450.*	7850	545	54½	16½	80,000	Ferrol	1925	Bld.	..	3 / —	..	8 *6-in.*, 4 *4-in.* A.A., 2 *3-pr.*	12	33 0	oil	560
g.b.	Recalde	787	213	30	9½	1100 Y	Cartagena	1911	1911	..	..	..	4 *3-in.*, 2 M.	..	13·8	..	121
l. cr.	Reina Regente	5778	363	52½	16¼	11,000 W.T.	Ferrol	1906	1910	..	..	3	10 *5·9-in.*, 12 *2·2-in.*, 2 l., 8 *1-pr.*	..	19·5	1178	452
„	Reina Victoria Eugenia. *See p. 451.*	5700	462†	50	15¾	25,000 P.T.	Ferrol	1920	1922	..	3–1½ / —	..	9 *6-in.*, 4 *3-pr.* A.A., 1 *12-pr.*, 4 M., 1 l.	4 (sub.)	25·5	650 coal & oil	420
„	Don Blas Lezo / Mendez Nuñez *See p. 451.*	4700	439	46	14½	45,000	Ferrol	1923 / 1923	1924 / 1924	..	..	..	6 *6-in.*, 4 *3-pr.* A.A., 4 M.	12	29·0 / 29·05t	..	343

Four 10,000 ton cruisers projected, but doubtful whether funds will be available to carry out this programme.
Aircraft carrier Dédalo 10,800 tons, converted 1922, can carry 2 small dirigibles, 2 balloons, and 25 planes.
Coastal gunboat Canovas des Castelo, 1235 tons and 18 knots, completed 1923—two others in hand at Ferrol.
Bonifaz, Lauria, Laya, Recalde, Don Alvaro de Bazan, Infanta Isabel, Hernán Cortés, Vasco Nuñez de Balboa, gun-boats of 800 tons.
Light cruiser Rio de la Plata, 1970 tons, converted to a mine-layer. Light gunboats Perla and Cartagenera, and motor-launches, M. 1–6, 40 tons (1919). Boys' training ship Galatea (*ex*-Clarastella), 2500 tons, recently bought in Italy. Several mine-trawlers and auxiliaries. Submarine salvage vessel Canguru. 2100 tons (1916).

† Extreme.

SWEDEN.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.b.	**Aeran**	3650	287	49¼	16·7	6500 Y.	Gothenburg	1901	1902	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2·2-in.*, 1 *1·4-in.*	2 sub.	17·2 *t*	300	300
„	**Dristigheten**	3620	285	48·5	17	5400 Y.	Gothenburg	1900	1901	..	8 K.S.	1⅞	..	..	8 N.S.	3¾ K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2·2-in.*, 1 *1·4-in.*	2 sub.	16·5	310	250
„	**Drottning-Victoria** *See p. 452.*	7605	396·7	61	21½	22,000 tur. Y.	Gothenburg	1917	1921	666,000	8–6 K.S.	1½	4 H.S.	..	8 K.S.	5 K.S.	4 *11-in.*, 8 *6-in.*, 6 *12-pr.*, 2 *2·2-in.*, 2 M.	2 sub.	22·0 *t*	350/800	450
a.c.	**Fylgia**	4980	377·6	48·5	20·6	12,440 Y. *t*	Stockholm	1905	1907	385,700	4 K.S.	2	..	..	5 K.S.	5 K.S.	8 *5·9-in.*, 14 *2·2-in.*, 2 *1·4-in.*	2 sub.	22·5 *t*	350/900	341
c.d.b.	**Gustav V.** *See p. 452.*	7605	396·7	61	21½	22,000 tur. Y.	Malmö	1917	1922	666,000	8–6 K.S.	1½	4 H.S.	..	8 K.S.	5 K.S.	4 *11-in.*, 8 *6-in.*, 6 *12-pr.*, 2 *2·2-in.*, 2 M.	2 sub.	22·0	350/800	450
„	**Manligheten**	3840	287	49¼	17·4	7400 Y.	Malmö	1903	1904	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5 9-in.*, 8 *2·2-in.*, 1 *1·4-in.*	2 sub.	17·0	400	300
„	**Oscar II** *See p. 452.*	4658	313·6	50·5	18	9000 Y.	Gothenburg	1905	1907	..	6 K.S.	2	6 K.S.	6 K.S.	7½ K.S.	5 K.S.	2 *8·2-in.*, 8 *6-in.*, 10 *2·2-in.*, 4 *1·4-in.*	2 sub.	18·0	350/500	339
„	**Sverige** *See p. 452.*	7605	396·7	61	21½	20,000 tur. Y.	Gothenburg	1914	1917	666,000	8–6 K.S.	1½	4 K.S.	..	8 K.S.	5 K.S.	4 *11-in.*, 8 *6-in.*, 6 *12-pr.*, 2 *2·2-in.*, 2 M.	2 sub.	22·0	350/800	450
„	**Tapperheten**	3990	287	49¼	17·7	6000 Y.	Malmö	1901	1903	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2 2-in.*, 1 *1·4-in.*	2 sub.	16·5	330	300
„	**Wasa**	3745	287	49¼	17	6000 Y.	Stockholm	1901	1902	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2·2-in.*, 1 *1·4-in.*	2 sub.	16·5	330	300

All the ships are now rated as coast-defence battleships, with the exception of the **Fylgia**. Older coast-defence ships **Oden, Thor, Niord** (1897, 1899, 1899), 3715 tons, 2 9·8-in., 6 4·7-in. guns; **Göta**, 3400 tons, **Thule**, 3300 tons. Mine cruisers **Clas Fleming**, 1800 tons, 4 4·7 in., 20 knots, **Edda**; other mining vessels **Sökaren, Sveparen, Sprängeren**, and others. Torpedo gunboats **Claes Horn, Jacob Bagge, Oernen, Psilander**, 830 tons, 2 4·7-in., 4 2·2-in., 20 knots. Two gunboats, 512–589 tons. Depôt ships for submarines, **Svea**, 3300 tons, **Skold**, 600 tons.

UNITED STATES.—Armoured Ships.

Class.	NAME / DATE FOR SCRAPPING.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. §	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Arizona** . . 1937 *See p.* 456.	31,400	596	97	28¾ †	34,000 B. & W. P. tur. (G.)	New York . (Navy Yard)	1915	1916	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (45 cal.), 14 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*	2 (sub.)	21·0	2300 Oil	1400
b.	**Arkansas** . 1935 *See p.* 459.	26,000	554	93¼	28½ †	28,533 P. tur.	Camden, N.J. (N.Y.S.B.Co.)	1911	1912	964,000	11–5 K.S.	3	..	8–6 K.S.	11 K.S	6½	12 *12-in.*, 16 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*	2 (sub.)	20·5 *t*	2700 / 400	1490
b.	**California** . 1941 *See p.* 454.	32,300	600	97½	30¼	28,500 Tur. (G.)	Mare Island (Navy Yard)	1919	1921	..	14 K.S.	..	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *14-pr.* A.A., 4 *6-pr.*	2 (sub.)	21·0	3500 Oil	1407
a. c.	**Charleston** .	9700	424	66	35 †	27,500 B.&W.	Newport News	1904	1906	563,030	4 H.S	3	4 H.S.	..	4 H.S.	..	12 *6-in.*, 4 *3-in.*, 2 *3-in.* A.A., 10 M., 2 l.	..	22·0	1800 Coal.	784
a.c.	**Charlotte** (*ex* North Carolina)	14,500	502	72⅞	25 †	29,785 B. & W.	Newport News	1906	1908	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 12 *3-in.*, 2 *3-in.* A.A., 4 *6-pr.*, 15 M. & l.	4 sub.	21·9 *t*	2000 Coal.	964
b.	**Colorado** . . 1942 *See p.* 453.	32,600	600	97½	30½ †	28,900 B. & W. tur.	N.Y.S.B. Co.	1921	1923	1,383,000	13½–12 K.S.	..	..	..	18 K.S.	..	8 *16-in.* (45 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *6-pr.*	2 (sub.)	21·0	2914 Oil	1407

§ The sums given in this column are exclusive of the cost of armour and armament according to the system of making appropriations in the estimates.
† Mean draught. ‡ Including armour, but not armament.

b.	**Florida**‡ . . 1934 *See p.* 460.	21,825	510	88¼	28⅓ †	27,036 B. & W. P. tur.	New York . (Navy Yard)	1910	1911	1,280,000	11	..	10	..	11	5	10 *12-in.*, 16 *5-in.*, 8 *3-in.* A.A., 6 *3-pr.*	2 (sub.)	20·75 *t*	2560 / 400	1014
a.c.	**Frederick** . (*ex* Maryland)	13,680	502	69½	24½	28,059 B. & W.	Newport News	1903	1905	756,400	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 10 *3-in.*, 2 *3-in.* A.A., 14 l.	2 (sub.)	22·4 *t*	2100 Coal.	898
a.c.	**Huntington** . (*ex* West Virginia)	13,680	502	69½	24½	31,437 B. & W.	Newport	1903	1905	798,310	6–3½ K.S.	4	5 K.S.	12 H.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 10 *3-in.*, 2 *3-in.* A.A., 8 *1 pr.*, 4 M., 1 l.	2 (sub.)	22·1 *t*	2100 Coal.	898
a.c.	**Huron** . . (*ex* South Dakota)	13,680	502	69½	26	28,598 B. & W.	S. Francisco.	1904	1907	770,570	14 K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 10 *3-in.*, 2 *3-in.* A.A., 7 *1-pr.*, 1 l.	2 sub.	22·0 *t*	2200 Coal.	899
b.	**Idaho** . . 1939 *See p.* 455	32,000	600	97½	30 †	32,000 B. & W. P. tur. (G.)	Camden, N.J. (N.Y.S.B. Co.)	1917	1919	1,485,000	6–3½ K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *14-pr.* A.A., 4 *3-pr.*	2 (sub.)	21·0	2914 Oil	1440
A.C.	**Lexington** .	33,000 approx.	874 *	104	30 †	180,000 tur. electric	Quincy, Mass.	..	..	..	..	..	..	..	..	..	8 *8-in.*, 12 *5-in.* A.A. Stowage for 72 aircraft. Fitted with a catapult.	6	34	Oil	..
b.	**Maryland** . 1941 *See p.* 453.	32,600	600	97¼	30½ †	28,900 T.	Newport News	1920	1921	1,383,000	13½–12 K.S.	..	..	..	18 K.S.	..	8 *16-in.* (45 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *6-pr.*	2 (sub.)	21·0	2914 Oil	1407
b.	**Mississippi** . 1938 *See p.* 455.	32,000	600	97¼	30 †	32,000 B. & W. Cur. t. (G.)	Newport News	1917	1917	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *14-pr.* A.A., 4 *6-pr.*	2 sub.	21·0	2914 Oil	1440

* Extreme. † Mean draught. ‡ Installation of anti-submarine and anti-aircraft protection and conversion to oil burning proposed and reported as authorised.

UNITED STATES.—Armoured Ships—*continued*.

Class.	NAME. Date for Scrapping.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. §	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal / Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons	
a.c.	**Missoula** (*ex* Montana)	14,500	502	72¾	27 †	27,958 B. & W.	Newport News	1906	1908	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.* 2 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.*, 10 *1-pr.*, 4 M., 1 l.	4 sub.	22·2 *t*	2000 / Coal	964
b.	**Nevada** 1936 *See p.* 457.	27,500	575	95¼	28½ †	23,312 Y. Cur. tur.	Quincy, Mass. (Fore River)	1914	1916	1,211,342	13½–8 K.S	1½–3	.. K.S.	13½ K.S.	18–16 K.S.	..	10 *14-in.* (45 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*	2 sub.	20·5	2000 / Oil	1360
b.	**New Mexico** 1939 *See p.* 455.	32,000	600	97¾	30 †	27,500 B. & W. Electric drive	New York (Navy Yard)	1917	1918	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *14-pr.* A.A., 4 *6-pr.*	2 (sub.)	21·0	2914 Oil	1440
.	**New York** * 1935 *See p.* 458.	27,000	565	95¼	28½ †	29,687 B. & W.	New York (Navy Yard)	1912	1914	1,315,114	12–4 K S	3	9 K.S.	10 K.S.	14–8 K.S.	6 K.S.	10 *14-in.* (45 cal.), 16 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*	4 sub.	21·0	2918 / 400	1500
b.	**Oklahoma** 1936 *See p.* 457.	27,500	575	95¼	29¾ †	21,703 B. & W.	New York	1914	1916	2,200,000	13½–8 K.S.	1½–3	K.S.	13½ K.S.	18–16 K S.	..	10 *14-in.* (45 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*	2 sub.	20·5	2000 / Oil	1360
b.	**Pennsylvania** 1937 *See p.* 456.	31,400	596	97	29¾ †	31,500 B. & W. Cur. tur.	Newport News	1915	1916	1,485,000	14 K.S.	3	..	..	18 K.S.	..	12 *14-in.* (45 cal.), 14 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*	2 sub.	21·0	2300 Oil	1002
a.c.	**Pittsburg**	13,680	502	69½	26	28,600 Nic.	Philadelphia (Cramp)	1903	1905	799,340	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 10 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.*, 18 *1-pr.*, 8 M., 1 l.	2 sub.	22·4 *t*	2100 / Coal	898
a. c.	**Pueblo** (*ex* Colorado)	13,680	502	69½	24½	26,837 Nic.	Philadelphia	1903	1905	756,000	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 10 *3-in.*, 2 *3-in.* A.A., 4 *3-pr.*, 12 *1-pr.*, 4 M., 1 l.	2 (sub.)	22·2 *t*	2100 / Coal	898

a.c.	**St. Louis**	9700	424	66	22½ †	27,264 B. & W.	Philadelphia (Cramp)	1905	1906	563,030	4 K.S.	3	4–3	..	4 K.S.	..	12 *6-in.*, 4 *3-in.*, 2 *3-in.* A.A., 2 *3-pr.*, 12 l. & M.	..	22·1 *t*	1800 / Coal	784
A.C.	**Saratoga**	33,000 approx.	874	104	30 †	180,000 tur.electric	N.Y. Ship-building Co.	1925	..	..	..	..	..	..	..	..	8 *8-in.*, 12 *5-in.* A.A., stowage for 72 aircraft. Fitted with a catapult	..	..	..	..
a.c.	**Seattle** (*ex* Washington)	14,500	502	72⅔	27	27,152 B. & W.	Camden, N.J.	1905	1906	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 12 *3-in.*, 2 *3-in.* A.A., 4 *6-pr.*, 4 M., 11 l.	4 sub.	22·3 *t*	2000 / Coal	964
b.	**Tennessee** 1940 *See p.* 454.	32,300	600	97½	30½ †	28,500 T.	New York Navy yard	1919	1920	..	14 K.S.	..	..	..	18 K.S.	..	12 *14-in.* (50 cal.), 12 *5-in.*, 8 *14-pr.* A.A., 4 *6-pr.*	2 sub.	21·0	2500 Oil	1407
b.	**Texas** * 1935 *See p.* 458.	27,000	565	95½	28½ †	28,100 B. & W. *t*	Newport News	1912	1914	1,166,000	12–4 K.S.	3	9 K.S.	10 K.S.	14–8 K.S.	6 K.S.	10 *14-in.* (45 cal.), 16 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*	4 sub.	21·0 *t*	2918 / 400	1500
b.	**Utah** * 1934 *See p.* 460.	21,825	510	88½	28½	28,477 B. & W *t.* P. tur	Camden, N.J.	1909	1911	813,500	11	..	10	..	11	5	10 *12-in.*, 16 *5-in.*, 8 *3-in.* A.A., 4 *3-pr.*	2 sub.	20·75 *t*	2560 / 400	1014
b.	**West Virginia** 1942 *See p.* 453.	32,600	600	97½	30½ †	28,900 T.	Newport News	1921	1923	1,383,000	13½–12 K.S.	..	.	..	18 K.S.	..	8 *16-in.* (45 cal.), 12 *5-in.*, 8 *3-in.* A.A., 4 *6-pr.*	2 sub.	21·0	2841 Oil	1407
b.	**Wyoming** * 1934 *See p.* 459.	26,000	554	93½	29¾ †	31,437 B. & W. P. tur	Philadelphia	1911	1912	963,800	11–9 K.S.	..	..	8–6 K.S.	11 K.S.	8	12 *12-in.*, 16 *5-in.*, 8 *3-in.* A.A., 6 *3-pr.*	2 sub.	20·5 *t*	2750 / 400	1490

* Installation of anti-submarine and anti-aircraft protection and conversion to oil burning proposed and reported as authorised.

§ See note on p. 374. † Mean Draught. ‡ Including armour, but not armament.

UNITED STATES.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. §	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Fuel. Coal. Oil.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
g.v.	Asheville	1575	225	41¼	11¼†	800 P. tur.	Charleston	1918	1919	176,718	..	..	3 *4-in.*, 2 *3-pr.*	..	12	..	157
scout cr.	Birmingham	3750	420	47	18¾†	15,670 Express	Quincy, Mass.	1907	1908	301,000	2–1½	..	4 *5-in.*, 2 *3-in.*, 1 *3-in.* A.A., 4 M.	2 sub.	24·3 *t*	1433 Coal	356
p.v.	Chattanooga	3200	292	44	17	5303 B.&W.	Elizabeth Port	1903	1904	212,325	2	..	6 *5-in.*, 1 *3-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 2 M., 1 l.	..	16·65 *t*	740 Coal	302
scout cr.	Chester	3750	420	47	18¾†	16,000 Nor. turb.	Bath, Me.	1907	1908	337,000	2–1½	..	4 *5-in.*, 2 *3-in.*, 1 *3-in.* A.A., 4 M.	2 sub.	26·5 *t*	1433 Coal	356
,, ,,	Cincinnati Concord *See p. 461.*	7500	550	55	19†	90,000	Tacoma, Wash. Philadelphia (Cramp)	1921	1924 1923	Cost and fee	2½ side	..	12 *6-in.*, 4 *3-in.* A.A., 2 *3-pr.*	2 twin and 2 triple above water 21-in.	33·7	2000 Oil.	450
p.v.	Cleveland	3200	292	44	17	4640 B.&W.	Bath, Me.	1901	1903	212,325	2	..	6 *5-in.*, 1 *3-in.* A.A., 2 *1-pr.*, 2 M., 1 l.	..	16·4 *t*	700 Coal	302
p.v. ,,	Denver Des Moines	3200	292	44	17	4135 B. & W.	Philadelphia Quincy, Mass.	1902	1904	212,325	2	..	6 *5-in.*, 1 *3-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·65	700 Coal	303
scout cr.	Detroit *See p. 461.*	7500	550	55	19†	90,000	Quincy, Mass. (Bethlehem)	1923	1923	Cost and fee.	2½ side	..	12 *6-in.*, 4 *3-in.* A.A., 2 *3-pr.*	2 twin and 2 triple above water 21-in.	33·7	2000 Oil.	450
p.v.	Galveston	3200	292	44	17	5073 B. & W.	Richmond, Va.	1903	1904	212,325	2	..	6 *5-in.*, 1 *3-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·4	700 Coal	302

A.c.	**Langley** ..	12,700	520	65	19	7160	..	..	1922	..	..	..	4 *5-in.*, 30 aeroplanes	..	14·5	..	..
scout cr.	**Marblehead**	7500	550	55	19†	90,000	Philadelphia (Cramp)	1923	1924	Cost and fee	2½ side	..	12 *6-in.*, 4 *3-in.* A.A.; 2 *3-pr.*	2 twin and 2 triple above water 21-in.	33·7	2000 Oil	450
"	**Memphis** . See p. 461.								1925								
..	**Milwaukee** . See p. 461.	7500	550	55	19†	90,000	Tacoma, Wash.	1921	1923								
scout cr.	**Omaha** .	7500	550	55	19†	90,000	Tacoma, Wash.	1920	1923	Cost and fee	2½ side	..	12 *6-in.*, 4 *3-in.* A.A.; 2 *3-pr.*	2 twin and 2 triple above water 21-in.	33·7	2000 Oil	450
"	**Raleigh** .						Quincy, Mass.	1922	1924								
"	**Richmond** . See p. 461.						Philadelphia (Cramp)	1921	1923								
p.v.	**Sacramento**	1425	225	40¾	11½	1022	Philadelphia	1913	1914	101,200	..	..	3 *4-in.*, 2 *3-pr.*, 2 M., 2 l.	..	12·8 *t*	428	156
scout cr.	**Salem** .	3750	420	47	18¾	22,242 W.T. turb.	Quincy, Mass.	1907	1908	301,000	2–1½	..	4 *5-in.*, 2 *3-in.*, 1 *3-in.* A.A., 2 M.	2 sub.	25·9 *t*	1433 Coal	356
p.r.	**Tacoma** .	3200	292	44	17	5288 B.&W.	S. Francisco.	1903	1904	212,325	..	2 shields	6 *5-in.*, 1 *3-in.* A.A., 4 *6-pr.*, 2 *1-pr.*, 4 M.	..	16·6 *t*	700 Coal	302
sc. cr.	**Trenton** . See p. 461.	7500	550	55	19†	90,000	Philadelphia (Cramp)	1923	1924	Cost and fee	2½ side	..	12 *6-in.*, 4 *3-in.* A.A., 2 *3-pr.*	2 twin and 2 triple above water 21-in.	33·7	2000 Oil	450
g.r.	**Tulsu** .	1575	225	41¼	11¼†	800	Charleston	1922	1923	..	..	..	3 *4-in.*, 2 *3-pr.*	..	12	..	157
A.T.	**Wright** .	11,000	448	58	30	6000	..	..	1921	..	..	..	2 *5-in.*, 2 *3-in.* A.A.	..	15	1630 Oil	313

§ Prices exclusive of armament. † Mean draught.

Eight cruisers of 10,000 tons displacement, mounting 8-in. guns, are authorised, and building will commence this year. To be completed in 1927.

Patoka, airship tender. Patrolling and gun vessels Helena, Sacramento and New Orleans, 1000 to 1392 tons; thirteen others and 10 patrolling yachts. About fifty patrol vessels (Eagles) and submarine chasers. Fleet seaplane tender Aroostook and others adapted. Mine-laying vessels Baltimore, San Francisco, and Shawmut, carrying 5-in. and small anti-aircraft guns. A large number of mine-sweepers and tugs. Submarine tenders Beaver, Bushnell, Camden, Fulton, Rainbow, Savannah and Canopus. Destroyer depôt ships Altair, Derobela, Rigel, Black Hawk, Buffalo, Dixie, Dobbin, Leonidas, Meville, and Whitney. Repair ships Topeka, Villalobos, Bridgeport, 7594 tons, Medusa, 10,000 tons, Prometheus and Vestal, 12,595 tons. Supply ships Arctic, Bridge, Rappahanock. Hospital ships Comfort, Mercy, Relief, and Solace Ulysses and Achilles, colliers, for the Panama Canal. Twelve other colliers and 13 oilers. River gunboats Monocacy and Palos, completed 1914. C.M.B. 1922, 2 18-in. torpedoes or depth-charges and 4 M., another with 18-in. torpedoes and 2 M.

Training ships Olympia, 5870 tons; Chicago, 4500 tons. Torpedo experimental vessel Montgomery, 2089 tons.

SHIPS OF THE LESSER NAVIES.

Austria.—Patrol vessels: Neretva, Compo, Fogas and Pozsony.

Belgium.—The maritime affairs of Belgium are under the control of the Minister of National Defence, who is responsible for the administration of the defences by land, sea, and air. The nucleus of the Navy consists of the sloop *ex* Zinnia 16 knots, one 4·7-in. and two 12-prs., for fishery protection duties, and 14 *ex* German torpedo boats. Several of these are now unfit for service.

Bulgaria.—Under the terms of the naval clauses of the Peace Treaty, Bulgarian warships of all classes, existing or under construction, were surrendered to the Allied and Associated Powers or broken up. All vessels are under the Ministry of Commerce for police and preventive duties; torpedo boats Derzki, Khrabri, Smelyi, and Strogi, with some motor boats of little value.

China.—Cruisers: Chao Ho (Elswick, 1912, 2,600 tons), Ying Jui (Barrow, 1912, 2750 tons)—two 6-in., two 4-in., ten smaller; Hai Yung, Hai Chou, and Hai Chen (Germany, 1897–1898, 2,950 tons)—three 5·9 in., eight 4-in. and smaller; Hai Chi (Armstrong's, 1899, 4,300 tons)—two 8-in., ten 4·7 in. and smaller. Destroyers: Chien Kang, Tung An, and Yu Chang, of 390 tons, speed 30 knots, armament: two 12-pr., two 3-pr., and two 18-in. T.T. Torpedo boats: Seventeen. River gunboats: Twenty-two. Also several despatch vessels and torpedo gunboats. There are, in addition, a few gunboats and miscellaneous vessels belonging to the water-police of the Kwang Tung Province.

Colombia.—Gunboats, Chercinto, Bogota, Cauca, and four guardacostas. River gunboats, General Nerino and Esperanza, 400 tons.

Cuba.—Light cruiser, Cuba, 2055 tons, 6000 H.P. 18 knots, and the training ship Patria, 1220 tons, 16 knots; also 5 gunboats, 4 submarine chasers and 13 revenue cutters.

Czecho-Slovakia.—There are six patrol ships and two tugs on river service.

Ecuador.—The torpedo cruiser Libertador Bolivar, mine-laying torpedo boat Tarqui, and special vessel Cotopaxi.

Egypt.—Sloop (*ex* Syringa), 1918, 1310 tons, 17 knots, two 4-in. guns. Nile stern-wheel gunboats Sultan, Sheikh, and Melik, 140 tons, Zafir, Fateh and Naseh, 128 tons; also the Abu Klea, Hafir, Metemmeh, and Tamai.

Esthonia.—The Navy consists of destroyers Wambola (*ex* Kapitan Kingsbergen), 1600 tons, 30 knots, four 4-in. guns, 2 M., 9 T.T., and Lennuk (*ex* Avtroil), 1800 tons, 32 knots, five 4-in. guns, and one 12-pr., 9 T.T., with gunboats, launches and some other vessels, including the *ex* Russian gunboat Bobr, 875 tons, two 4·7-in. and four 12-pr. guns, completed in 1908, which has received the name of Lembit. One mine-layer, three sweepers, five ice-breakers, and Peipus Lake gunboats Ahti and Tartu.

Finland.—The *ex* Russian gunboat Gilyak, 875 tons, two 4·7-in. and four 12-pr. guns; patrol boats Klas Horn (*ex* Posadnik), Matti Kurki (*ex* Voevoda), Karjala (*ex* Filin), and Turunmaa (*ex* Orlan); also 3 *ex* Russian torpedo boats, three submarines, three transports, 2 motor boats, 4 ice-breakers, and several mine-sweepers and layers. A Parliamentary Committee has recommended an eight year construction programme of three gunboats, two destroyers, six submarines (two large and four small), thirty motor torpedo boats (C.M.B.'S), one training ship, and two barges to serve as bases for minelayers.

Hayti.—Four special service vessels ranging from 270 tons to 1200 tons.

Hungary.—Patrol vessels: Debreczen, Kecskemet, Siofok, Szeged, and 4 others; also 10 motor launches.

Jugo-Slavia.—River monitors on the Danube: Drava (*ex* Enns), Morava (*ex* Körös), Sava (*ex* Bodrog), Varda (*ex* Bosnia). Two patrol vessels and 12 *ex* Austro-Hungarian torpedo boats (F. and T. classes) lightly armed, for police and preventive duties only; ten mine-sweepers, 16 seaplanes, and several transports.

Latvia.—Gunboat Virsaitis (*ex* German M 68).

Mexico.—Gun-vessels, Tampico and Vera Cruz (Elizabethport, New Jersey, 1902); displacement, 980 tons; armament, four 4-in. Q.F., six 6-pr.; 16 knots; fitted to serve as transports for 200 troops, Bravo 1200 tons; 2600 I.H.P.; 17 knots (Leghorn, 1904), and Aguas Prieta, 1200 tons; 1800 I.H.P.; 15 knots. Training ship Zaragoza, 1200 tons, 1300 H.P., 15 knots, four 4·7-in. and four small Q.F. Two revenue cutters. A small aircraft establishment. On the Pacific side, two gunboats and a transport.

Peru.—Almirante Grau and Coronel Bolognesi, cruisers, 3200 tons; (Barrow, 1906); two 6-in., eight 14-pdr., eight 1¼-pdr.; 2 submerged torpedo tubes; 24 knots; also Lima (training.) Gunboat America. Destroyer, Rodriguez, 500 tons, and submarines, Ferré and Palacios, built Le Creusot, 1912–13. Three submarines, Arica, Tacna, and Tarapacá, have been built in Italy (Ansaldo). Five river launches, two vedettes, and a small seaplane establishment.

Poland.—The Polish Government hopes eventually to become possessed of a small Navy. The British Naval Mission was withdrawn. It is proposed that Poland shall be allowed six small cruisers and gunboats on the Vistula. She has been allotted six *ex* German torpedo boats for police purposes. Gunboats, Komendant Pilsudski, 500 tons, carrying several small guns, and General Haller, built in Finland. Training ship, Lwow. Monitors, Warszowa, Horodyszcre, Pinsk, Mozyrz, and some 15 minor vessels. About 30 *ex* Italian flying-boats, and 5 *ex* German aeroplanes. Reports state that a new construction programme for three cruisers, six destroyers, twelve torpedo boats, twelve submarines, and thirty-six small craft has been approved, the building period to extend over twelve years.

Portugal.—The most considerable vessel in the Portuguese Navy was the cruiser Almirante Reis, now dismantled, completed at Elswick in 1899; 4100 tons, 12,000 H.P.; four 5·9-in., eight 4·7-in., fifteen smaller guns, five tubes; 22 knots. The Adamastor, 1962 tons, completed at Leghorn in 1897, and the São Gabriel at Havre in 1899, have as their chief armament, two 5·9-in. and four 4·7-in. guns. Eleven gunboats mainly for Mozambique and Timor. The minelayer Vulcano was built by Messrs. Thornycroft in 1909. There are other small boats, and several sloops sold out of the British Navy are being added. These are the Republica (*ex* Gladiolus), and Carvalho Araujo (*ex* Jonquil.) Portugal has the old destroyer Tejo and three modern, Douro, Guadiana, and Vouga (1912–18), 700 tons 11,000 H.P., 30 knots, two tubes, also four *ex* Austrian F boats for police duties. Submarines Espadarte, 245–300 tons, 13 knots (F.I.A.T.), and Foca, Golfinho, and Hidra (Laurenti); 260–389 tons, 13–8·5 knots, 2 T.T. Seaplane establishments at Belem, Faro and Aviero. The gunboat Patria is at Lourenço Marques.

Roumania.—The Black Sea Force comprises the flotilla leaders Marasti and Maracesti, and the torpedo boats Vijelia, Sborul, Naluca, Zmeul, Vartejul, and Viforul, four *ex* French gunboats fitted as mine-layers, and six *ex* Italian motor launches. At Constanza and Sulina are the old protected cruiser Elizabeta, now a hulk, the minelayer Alexandru-cel-Bun (104 tons), and some tugs; and at Galatz

the pilots' school, two river transports and some tugs. The Danube flotilla comprises the monitors Ioan Bratianu, Alexandru Lahovary, Lascar Catargiu, Mihail Kogalniceanu, Besarabia, Bucovina, and Ardeal (600 tons, three 4·7-in guns), seven vedettes, and the yacht Macinul. Seven *ex* Austrian F and T torpedo boats were assigned to Roumania for police duties. It is reported that a contract has been made with Messrs. Pattison for the construction of four destroyers for the Black Sea force.

Santo Domingo.—The Independencia, built in England 1894, 322 tons, seven Hotchkiss Q.F. Four patrol vessels for revenue service.

Sarawak.—Gunboat Aline and steamboats Lorna Doone and Aden.

Siam.—The gunboats Bali and Sugrib, Muratha and Mongkut, 500–700 tons, one 4·7-in. Q.F., five 2·2-in., four 1·4-in., 11–12 knots, launched 1898, 1901, 1898, and 1887 respectively. Three despatch vessels, 100 to 250 tons. Two 380-ton, 27-knot destroyers, built at Kobe, Sua Gamron Sindhu and Sua Tayanchou. Phra Ruan (*ex* British destroyer Radiant, 1917). A coastal motor boat is being built in England. There is no definite organisation of the Siamese ships and vessels, which occasionally cruise from Bangkok.

Turkey.—The old battleship Torghad Reis (*ex* German Weissenburg, 1891). The battle-cruiser Yavouz Sultan Selim (*ex* Goeben), 24,000 tons, 25 knots. Armament: ten 11-in., ten 5·9-in. and smaller. Light cruisers: Hamidieh (Elswick, 1903), 3,830 tons, speed 22 knots, armament: two 5·9-in., and smaller; Medjidieh (Philadelphia, 1903), 3,300 tons, speed 22 knots, armament: four 5·1-in. and smaller. Destroyers, six; torpedo boats, six; and several gunboats, minelayers, and yachts.

According to reports an extensive programme of construction and modernisation is under consideration. This programme includes the repair and modernisation of the Yavouz Sultan Selim and the Hamidieh, and the ordering from foreign yards of two battleships, to be named Moustapha-Kemal and Djoumhouriete, four cruisers, three leaders, twelve destroyers, four submarines, and several minelayers. This programme would be divided into three parts and spread over a period of eight years.

Uruguay.—Light cruiser Monte Video, torpedo-cruiser Uruguay, built at the Vulcan Yard, Stettin; 1400 tons; two 4·7-in.,

four 12-pdr., twelve Maxims; two 18-in. torpedo tubes. Torpedo boat Oriental, yacht 18 de Julio, and some special vessels.

Venezuela.—Marescal Sucre (*ex* Isla de Cuba), drill ship bought from United States, 1912. Gunboats, General Salom, Miranda, José Felix Pribas, Antonio Diaz.

BRITISH AND FOREIGN FLOTILLAS.

Great Britain.

Name or Number.	Built by.	Completed.	Dimensions. Length (extreme).	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
					FLOTILLA LEADERS.								
			ft. ins.	ft. ins	ft. ins.		Tons.		Knots.				Tons.
Abdiel	Cammell Laird	1916											
Grenville													
Seymour	,, ,,	1916	325	31 9	10 9 mean, 12 0 max.	3	1610 to 1680	36,000	34	4 4-in. Q.F. 1 2-pr., 1 3-in. A.A. (Abdiel 3 4-in. Minelayer.)	4	130 to 140	Oil. 515
Saumarez													
*Nimrod	Denny	1915											
Shakespeare	Thornycroft	1917											
Spenser	,,	1917											
Wallace	,,	1919	329	31 11	12 4	2	1750	40,000	36	5 4·7-in. 1 3-in. A.A. 2 2-pr. A.A.	6	182	Oil. 500
Keppel	,,	1925											
Broke, *ex* Rooke	,,	1925											
Bruce													
Douglas													
Campbell													
Mackay, *ex* Claverhouse	Cammell Laird	1918 1919	332 6	31 9	12 3	2	1800	40,000	36·5	5 4·7-in. 1 3-in. A.A. 2 2-pr. A.A. Campbell has no 2-pr.	6	182	Oil. 500
Malcolm		1919											
Montrose	Hawthorn	1918											
Stuart	,,	1918											

TORPEDO BOAT DESTROYERS.

Name or Number.	Built by.	Completed.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Amazon (*T*)	Thornycroft	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Ambuscade (*Y*)	Yarrow	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Admiralty "S" Class:													
Sabre	Stephen	1918											
Shamrock	Doxford	1919	276	26¾	10⅝	2	1075	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	301
Saladin	Stephen	1919											
Sardonyx	,,	1919											
Tactician	Beardmore	1918	276	26¾	10⅝	2	1075	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	301
Tara	,,	1918									2 D. 2 S.		
Scimitar	Brown	1918											
Scythe	,,	1918											
Seabear	,,	1918											
Seafire	,,	1918											
Searcher	,,	1918											
Seawolf	,,	1918											
Sepoy	Denny	1918											
Seraph	,,	1918											
Serapis	,,	1919											
Serene	,,	1919											
Sesame	,,	1919											
Sirdar	Fairfield	1918											
Somme	,,	1918											
Steadfast	Palmer	1919											
Sterling	,,	1919											
*Spear	Fairfield	1918											
Spindrift	,,	1919	276	26¾	10⅝	2	1075	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	301
Turbulent	Haw. Leslie	1919											
Tenedos	,,	1919											
Thanet	,,	1919											
Thracian	,,	1922											
Stormcloud	Palmer	1920											
Strenuous	Scott	1919											
Stronghold	,,	1919											
Sturdy	,,	1919											
Sportive	Swan Hunter	1918											
Sparrowhawk	,, ,,	1918											
Splendid	,, ,,	1918											
Simoom	Brown	1918											
Swallow	Scott	1918											
Tilbury	Swan Hunter	1918											
Tintagel	,, ,,	1918											

* These vessels have been placed on the sale list.

Great Britain—*continued.*

Name or Number.	Built by.	Completed.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
DESTROYERS—*Admiralty "S" Class—contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Tomahawk (*Y*)	Yarrow	1918											
Tumult (*Y*)	"	1918											
Turquoise (*Y*)	"	1919	273½	25¾	9⅝	2	930	23,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	256
Tuscan (*Y*)	"	1919											
Tyrian (*Y*)	"	1919											
Tribune	J. S. White	1918											
Trinidad	" "	1918											
Trojan	" "	1918	276	26¾	10⅝	2	1075	27,000	36				
Truant	" "	1919											
Trusty	" "	1919											
Torbay (*T*)	Thornycroft	1919	275¾	27½	10½	2	1075	29,000	36				
Toreador (*T*)	"	1919											
Tourmaline (*T*)	"	1919											
Sikh	Fairfield	1918											
Senator	Denny	1918											
Shark	Swan Hunter	1918	276	26¾	10⅝	2	1075	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	301
Scout	Brown	1918											
Scotsman	"	1918											
Torch (*Y*)	Yarrow	1918	273½	25¾	9⅝	2	930	23,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	256
Shikari	Doxford / Chatham	1924	276¼	26¾	10⅝	2	1075	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	301
Admiralty "V" Class:													
Vansittart	Beardmore	1919											367
Venomous	Brown	1919											353
Verity	"	1919											353
Volunteer	Denny	1919	312	29½	10⅝	2	1325	27,000	34				370
Veteran	Brown	1919											363
Wanderer	Fairfield	1919											367
Wishart (*T*)	Thornycroft	1920											374
Wren	Yarrow	1923	312	30¼	10·9	2	1350	30,000	35	4 4·7 in., 2 2-pr., 1 M., 4 L.	2 T.	130	370
Whitshed	Swan Hunter	1919											368
Wild Swan	" "	1919											368
Witherington	J. S. White	1919											365
Wivern	" "	1919											365
Wolverine	" "	1920	312	29½	10⅝	2	1325	27,000	34				365
Worcester	" "	1922											365
Whitehall	Swan Hunter / Chatham	1925											365
Witch	Thornycroft / Devonport	1925											365
Walpole	Doxford	1918											
Whitley	"	1918								4 4-in., 1 2 pr., 1 M., 4 L.	2 T.	120	367
Waterhen	Palmer	1918	312	29½	10⅝	2	1300	27,000	34				
Wryneck	"	1918											
Windsor	Scott	1918								4 4-in., 1 3-in. A.A., 1 M., 4 L.	2 T.	120	367
Wrestler	Swan Hunter	1918											
Woolston (*T*)	Thornycroft	1918	312	30½	10¼	2	1325	30,000	35	4 4-in., 1 2-pr., 1 M., 1 L.			374
Wolsey (*T*)	"	1918									2 T.	120	374
Wessex	Haw. Leslie	1918	312	29½	10·7	2	1300	27,000	34				369
Winchester	J. S. White	1918	312	29½	10·7	2	1300	27,000	34	4 4-in., 1 3-in. A.A., 1 M., 4 L.	2 T.	120	369
Wolfhound	Fairfield	1918	312	29½	10·7	2	1300	27,000	34	4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120	369
Westminster	Scott	1918								4 4-in., 1 3-in. A.A., 1 M., 4 L.	2 T.	120	367
Westcott	Denny	1918											
Wakeful	Brown	1917											
Walker	Denny	1918											
Walrus	Fairfield	1918											
Warwick	Haw. Leslie	1918											
Watchman	Brown	1918	312	29½	10·7	2	1300	27,000	34	4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120	367
Whirlwind	Swan Hunter	1918											
Winchelsea	J. S. White	1918											
Vanessa	Beardmore	1918											
Vanity	"	1918											
Voyager	Stephen	1918											
Vidette	"	1918								4 4-in., 1 3-in. A.A., 1 M., 4 L.	2 T.	120	367
Vivien	Yarrow	1918									2 D.		
Valhalla	C. Laird	1917								4 4-in., 1 3-in. A.A., 1 M., 4 L.	2 T.		
Valentine	"	1917											
Valkyrie	Denny	1917	312	29½	10⅝	2	1325	27,000	34	4 4in., 1 2-pr., 1 M., 4 L.		120	369
Valorous	"	1917									2 T.		
Vampire	J. S. White	1917	..	..	..	..	..	..	..	4 4-in., 1 3-in. A.A., 1 M., 4 L.	2 T.		

Great Britain—*continued.*

Name or Number.	Built by.	Completed.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
DESTROYERS— *Admiralty "V" Class—contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Vancouver ..	Beardmore ..	1918	..	..	..	..	..	..	..	4 4-in., 1 2-pr., 1 M., 4 L.	1 T., 1 D.		
Vanoc ..	Brown ..	1917	..	..	..	..	..	..	..	4 4-in., 1 3-in. A.A., 1 M., 4 L.	2 D.		
Vanquisher ..	,, ..	1917											
Vectis ..	J. S. White ..	1917									2 T.		
Vega ..	Doxford ..	1917								4 4-in.,			
Velox ..	,, ..	1918	312	29½	10·7	2	1300	27,000	34	1 2-pr.,	1 T., 1 D		
Vendetta ..	Fairfield ..	1917								1 M., 4 L.			
Venetia ..	,, ..	1917									2 T.		
Venturous ..	Denny ..	1917	..	..	..	..	..	..	..	.. .. ..	2 T.	120	369
Verdun ..	Haw. Leslie ..	1917	..	..	..	..	..	..	..	4 4-in., 1 3-in A.A.	2 D.		
Versatile ..	,, ..	1918								4 4-in., 1 2-pr.	1 T., 1 D.		
Vesper ..	Stephen ..	1918								4 4-in., 1 3-in.	2 T.		
Viceroy (*T*) ..	Thornycroft ..	1918	312	30½	10¾	2	1325	30,000	35		2 T.		
Viscount (*T*) ..	,, ..	1918									2 T.		
Vimiera ..	Swan Hunter ..	1917	312	29½	10⅝	2	1300	27,000	34	4 4-in.,	2 T.		
Violent ..	,, ,, ..	1917								1 2-pr.,	2 T.		
Vivacious ..	Yarrow ..	1917	312	29½	10⅜	2	1300	27,000	34	1 M., 4 L.	2 T.		
Vortigern ..	J. S. White ..	1918									2 T. 1 D.		
Admiralty "R" Class;													
Tancred ..	Beardmore ..	1917									2 D.		
Tarpon ..	Brown ..	1917	276	26¾	10⅝	2	1065	27,000	36	3 4-in., 1 2-pr.,	2 D.	98	296
Telemachus ..	,, ..	1917								1 M., 4 L.	1 D.		
Tempest ..	Fairfield ..	1917	275¼	26⅝	10⅝	2	1065	27,000	36	3 4-in., 2 3-pr.,			
Tenacious ..	H. & Wolff ..	1917	275¾	26⅞	10⅞	2	1065	27,000	36	1 2-pr., 1M., 4 L.	2 D.	98	296½
Tetrarch ..	,, ..	1917	275¾	26⅝	10⅝	2	1065	27,000	36				
Thisbe ..	Haw. Leslie ..	1917	275½	26¾	10⅞								
Thruster ..	,, ..	1917				2	1065	27,000	36				
Tormentor ..	Stephen ..	1917	276⅛	26¾	10⅝								
Torrid ..	Swan Hunter ..	1917	275¾	26¾	10¾								
Truculent (*Y*) ..	Yarrow ..	1917											
Tyrant (*Y*) ..	,, ..	1917	271½	25¾	9½	2	900	23,000	36				
Taurus (*T*) ..	Thornycroft ..	1917	276¼	27	10½	2	1065	29,000	35				
Teazer (*T*) ..	,, ..	1917											
Satyr	Beardmore ..	1917	275½	26⅝	10⅞								
Sharpshooter ..	,, ..	1917											
Skate ..	Brown ..	1917	276	26¾	10⅝								
*Skilful ..	H. & Wolff ..	1917	275¾	26½	10⅜								
*Springbok ..	,, ..	1917	275¾	26⅝	10⅞								
Starfish ..	Haw. Leslie ..	1916											
Stork ..	,, ..	1917				2	1065	27,000	36				
Romola ..	Brown ..	1916	275½	26¾	10⅝								
Rowena ..	,, ..	1916											
Restless ..	,, ..	1916											
*Rigorous ..	,, ..	1916											
*Rocket ..	Denny ..	1916								3 4-in.,			
*Rob Roy ..	,, ..	1916	276	26¾	10⅞					1 2-pr.,	2 D.	98	300
Redgauntlet ..	,, ..	1917								1 M.,			(*Y*) 256
*Rosalind (*T*) ..	Thornycroft ..	1916	274	27⅛	10⅛	2	1035	29,000	35	4 L.			(*T*) 285
Retriever (*T*) ..	,, ..	1917											
*Redoubt ..	Doxford ..	1917	274	26¾	10⅝								
*Sturgeon ..	Stephen ..	1917	276	26¾	10⅞								
*Sceptre ..	,, ..	1917	276⅛	26¾	10⅝								
Salmon ..	H. & Wolff ..	1916	275¾	26¾	10⅞								
*Sylph ..	,, ..	1917				2	1065	27,000	36				
*Sarpedon ..	Haw. Leslie ..	1916	275½	26¾	10⅞								
Sable ..	J. S. White ..	1916	275¾	26¾	10⅝								
Sorceress ..	Swan Hunter ..	1916	276	26¾	10⅞								
Radstock ..	,, ..	1916	275¾	26¾	10⅝								
Raider ..	,, ..	1916											
Sabrina (*Y*) ..	Yarrow ..	1916	271½	25¾	9½	2	900	23,000	36				
*Sybille (*Y*) ..	,, ..	1916	269½	25¾	9½								
Rapid (*T*) ..	Thornycroft ..	1916	274¼	27⅛	10	2	1035	27,500	35				
*Ready (*T*) ..	,, ..	1916											
*Relentless (*Y*) ..	Yarrow ..	1916	271½	25¾	9½	2	900	23,000	36				
*Rival (*Y*) ..	,, ..	1916											

* These vessels have been placed on the sale list.

Great Britain—*continued.*

Name.	Built by.	Completed.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
DESTROYERS— *Admiralty Modified "R" Class:*			Feet.	Feet.	Feet.		Tons.						Tons.
Ulster	Beardmore ..	1917											
Umpire	Doxford	1917											
Undine	Fairfield	1917											
Urchin	Palmer	1917											
*Ursa	"	1917	276	26¾	10½	2	1085	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D.	98	300
Ursula	Scott	1917											
Tower	Swan Hunter ..	1917											
Trenchant	J. S. White ..	1917											

* On sale list.

SLOOPS.

Of the large number of sloops built during the war for patrol and other duties, only thirty-two now remain in the Post-War Fleet—some in commission abroad and others for subsidiary and training duties in home waters.

Names are as follow: Harebell, Windflower, Chrysanthemum, Bryony, Sweetbriar, Heather—1290 tons; length, 276 ft.; H.P. 2500; speed, 16½ knots; armament, two 4-in., two 12-prs. (Heather has one 4-in., one 12-pr., and one 3-pr. A.A.).

Cornflower, Crocus, Cyclamen, Delphinium, Godetia, Lupin, Rosemary, Snapdragon, Valerian, Verbena, Wallflower, Wistaria—1250 tons; length, 267¾ ft.; H.P., 2000; speed, 16½ knots; armament, two 4-in., four 3 pr. A.A.

Clematis, Heliotrope, Daffodil, Bluebell, Magnolia, Laburnum, Veronica, Vulcan II. (*late* Lily), Dahlia, Foxglove, Hollyhock—1200 tons; length, 262½ ft; H.P. 1800; speed, 16½ knots; armament, two 4-in.. four 3-prs., one or two 2-prs.

Ladas, Silvio, and Sir Hugo—1320 tons; length, 276½ ft.; H.P., 2500; speed, 17 knots.

TWIN-SCREW MINE-SWEEPERS.

The following are retained in the Post-War Fleet:—

Aberdare, Abingdon, Alresford, Albury, Dryad, Caterham, Fareham, Sherborne, Mistley, Burslem, Truro, Badminton, Bagshot, Tring, Leamington, Dorking, Dundalk, Dunoon, Elgin, Faversham, Fermoy, Ford, Forres, Gainsborough, Gretna, Harrow, Holderness, Huntley, Kendal, Lydd, Mallaig, Malvern, Marazion, Marlow, Nailsea, Newark, Northolt, Pangbourne, Ross, Rugby, Saltash, Saltburn, Selkirk, Shrewsbury, Southdown, Stafford, Stoke, Sutton, Tedworth, Tiverton, Tonbridge, Tralee, Wetherby, Weybourne, Widnes, Yeovil—800 tons; length, 231 feet; H.P., 2200; speed, 16 knots; armament, one 4-in., one 12-pr.

Most of the foregoing form a "Central Reserve of Twin-Screw Mine-sweepers." In addition, the following are employed on surveying duties:—

Beaufort, Fitzroy, Flinders, Kellet.

Displacement, 800 tons; length, 231 ft.; H.P., 2200; speed, 16 knots; armament, one 3-pdr.; 140 tons of coal; complement, 74.

Other surveying ships, of new types, are the Herald (*ex*-Merry Hampton), the Ormonde, and the Iroquois; and of old types, the Endeavour, Fantome, and Mutine. The two last-named are to be disposed of on relief by the Herald and Ormonde respectively.

PATROL BOATS.

The following are retained in the Post-War Fleet:—

P 31, P 38, P 40, P 59, PC 73, PC 74.

P's displacement, 613 tons; length, 244½ ft.; H.P., 3500; speed, 20 knots; armament, one 4-in., one 2-pdr.; oil, 93 tons; complement, 54.

PC's displacement, 694 tons; length, 247 ft.

SUBMARINES.

"*H*" *Class*:—H 21, H 22, H 23, H 24, H 25, H 26, H 27, H 28, H 29, H 30, H 31, H 32, H 33, H 34, H 43, H 44, H 47, H 48, H 49, H 50, H 52.

Surface displacement, 440 tons, submerged, 500; surface H.P., 480, submerged, 320; surface speed, 13 knots, submerged, 10½ knots; oil, 16 tons; armament, four 21-in. tubes; complement, 23.

"*K*" *Class*:—K 26.

Surface displacement, 1880 tons, submerged, 2560; surface H.P., 10,000, submerged, 1400; surface speed, 24 knots, submerged, 9½ knots; oil, 200 tons; armament, three 4-in., ten 18-in. tubes; surface propulsion by steam turbines; complement, 57.

"*L*" *Class*:—L 1, L 2, L 3, L 4, L 5, L 6, L 7, L 8, L 9, L 11, L 12, L 14, L 15, L 16, L 17, L 18, L 19, L 20, L 21, L 22, L 23, L 25, L 33, L 52, L 53, L 54, L 56, L 69, L 71. Building, L 26, L 27.

Surface displacement, 890 tons, submerged, 1080; surface H.P., 2400, submerged, 1600; surface speed, 17½ knots, submerged, 10½ knots; oil, 76 tons; armament, one 4-in., six 18-in. tubes (L 52 and later boats have two 4-in. guns each); complement, 39.

"*M*" *Class*:—M 1, M 2, M 3 (*ex*-K 18, K 19, and K 20). Surface displacement, 1600 tons, submerged, 1950; surface H.P., 2400, submerged, 1600; surface speed, 15½ knots, submerged, 9½ knots; oil, 76 tons; armament, one 12-in., one 3-in., one M., four tubes, complement, 68.

"*R*" *Class*:—R 4, R 10.

Surface displacement, 420 tons, submerged, 500; surface H.P., 240, submerged 1200; surface speed, 9½ knots, submerged, 15 knots; oil, 13 tons; complement, 23.

"*X*" *Class*:—X 1: length 350 ft., beam 29 ft. 10 ins., mean draught 17 ft., surface displacement, 2780 tons, submerged, 3600 tons. Cost *ex*-armament £941,794. Building at Chatham. Other particulars uncertain.

"*O*" *Class*:—O 1: surface displacement, 1480 tons, submerged, 1750 tons. Building at Chatham. Other particulars uncertain.

Argentine Republic.

Name or Number.	Where Built.	Launched	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
DESTROYERS*—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Catamarca	Schichau ..	1911	288·7	27	8·6	2	950	18,000	32	3 4-in.	4	100	360
Jujuy	Germania ..												
Cordoba	Shichau ..	1910	295	29·5	7·8	..	950	20,000	34·7	3 4-in.	4	100	340
La Plata	Germania ..	1911											
TORPEDO BOATS—													
Corrientes	Yarrow ..	1896	190	19 5	8·2	2	340	4,000	27·4 *t.*	1 14-pr.,	3	66	80
Missiones	Yarrow ..	1896							26·0 *t.*	3 6-prs.,			
Entre Rios	Yarrow ..	1896							26·7 *t.*	and 2 1-pr.			
Comodoro Py ..	Thornycroft	1890	150	14·6	3·5	..	110	1,700	24·5	2 3-pr., 1 M.	3	43	24
Murature	"												
Buchardo	Yarrow ..	1890	130	14	6	..	85	1,200	23	2 3-pr., 1-M.	3	28	22
Jorge													
Thorne													

* To be modernised and converted to all oil burning in U.S.A.

Brazil.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Para	Yarrow ..	1908	240	23·6	10	2	560	7,014	27·25	2 4-in., 4 3 prs.	2	..	140
Amazonas		1908						6,898	27·17				
Piahuy		1908						6,563	27·21				
Matto Grosso		1908						7,403	27·16				
Parahyba..		1909						6,700	27·29				
Rio Grande do N. ..		1909						7,778	27·27				
Alagoas		1909						7,403	27·25				
Santa Catharina ..		1909						6,982	27·30				
Parana		1910						8,877	28·74				
Sergipe		1909						8,554	27·60				
Almirante Alexandrino de Alencar	Thornycroft..	1913	265·3	26·5	10·2	..	934	22,500	31	3 4-in., 1 2-pr.	2	..	250
TORPEDO BOATS—													
Goyaz	Yarrow ..	1907	152·5	15·3	..	3	..	..	26·5	2–3 prs.	2	..	..
SUBMARINES—													
F 1, 3. 5	Muggiano (Fiat)	1914	150	14	9·8	..	250–375	..	14–8·5	..	2	..	..

Six *ex* German torpedo-boats were allotted to Brazil, to be used for police purposes. A Laurenti submarine salvage and testing vessel, named Ceará, 3800 tons, 328 ft. long, 50 ft beam, 14 knots.

According to reports a Naval Parliamentary Commission recommended that five destroyers should be constructed to replace units which have lost their military value.

Chile.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Almirante Lynch, Condell..	White.. ..	1912 1913	320	32·6	11·1	3	1850	30,000	31·7	6–4-in. 2 M.	4	160	507
Almirante Riveros (*ex*-Broke) .. Almirante Uribe (*ex*-Faulknor) .. Almirante Williams (*ex*-Botha)	White ..	1914	320	32·6	11	3	1700 to 1740	30,000	31·5	2–4·7-in., 2–4-in.	4	160	486
Capitan Orella ..	Laird	1896	210	21·5	5·4	2	300	6,000	30·17	1-12 pr. Q.F. 5 6 pr.	2	65	90
Capitan Muñoz Gamero..	Laird	1896	210	21·5	5·4	2	300	6,000	30·42	1-12 pr. Q.F. 5–6 pr.	2	65	90
Teniente Serrano ..	Laird . ..	1896	210	21·5	5·4	2	300	6,000	30·35	1–12 pr. Q.F. 5-6 pr.	2	65	90
Guardia-Marina Riquelme	Laird	1896	210	21·5	5·4	2	300	6,000	30·09	1–12 pr. Q.F. 5-6 pr.	2	65	90
Capitan Merino Jarpa .. .. .. Capitan O'Brien ..	Laird	1901	210	21·5	5·4	2	350	6,000	30	Do.	2	65	90
Captain Thompson..	Armstrong .	1902	210	21·5	5·5	2	350	6,500	28	6–6 pr.	2	65	120

Six submarines (Holland type) built for the British Government in 1915 were ceded to the Chilian Navy in 1917. They are numbered H 1 to H 6; 360–470 tons, 480–320 H.P., 11–5 knots, length 150 feet, 4 T.T.

Denmark.

Number and Name.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
TORPEDO BOATS.			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FIRST CLASS—													
B10. Havkatten ..		1919											
B11. Sælen		1919											
B9. Nordkaperen ..		1918											
B8. Makrelen		1918											
B7. Narhvalen ..		1917											
B6. Havhesten ..		1917	126·3	13·9	9	2	108·5	2,000	24·6	2 6-pr. A.A.	2	22	15
B5. Söhunden	Royal Dockyard, Copenhagen	1917											
B4. Sölöven		1916											
B3. Stören		1916											
B2. Springeren		1916											
B1. Ormen		1907	124·6	14·3	8·5	1	105	2,100	26	2 1-pr.	3	21	11
E3. Sværdfisken ..		1913											
E2. Delfinen		1913	148·2	16·9	7·5	2	190	3,480	26·2	1 6-pr.	4	30	28
E1. Hvalrossen ..		1913											
D3. Söúlven	Burmeister, Copenhagen	1911											
D2. Flyvefisken ..		1911	181·7	18	9·7	2	275	5,000	27·5	2 12-pr.	5	33	55
D1. Söridderen	Yarrow & Co.	1911											
C3. Spaekhuggeren ..	Royal Dock., Copenhagen												
C2. Vindhunden ..		1911	184·8	19·1	7·1	2	300	5,000	27·5	2 12-pr.	5	34	49
C1. Tumleren	Schichau												
A3. Sobjornen		1898 recon. 1908											
A2. Havornen	Royal Dockyard, Copenhagen	1897 recon. 1902	147	15·5	7·5		140	2,100	23	1 3-pr.	4	25	15
A1. Hajen		1896 recon. 1908											

SUBMARINES—Bellona, Flora, Rota, 301–369 tons, 1 2·2-in. A.A., 4 T.T. Galathea, Neptun, Triton, Ran, Ægir, 185-235 tons, 13·5 9·8 kts., 1 2·2-in. A.A., 3 T.T. Nymfen, Najaden, Havfruen, Havmanden, Thetis, Anden 2 April, 167–204 tons, 13·5 8 kts., 2 M., 2 T.T. Two building.

France.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
FLOTILLA LEADERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Chacal	St. Nazaire..	1924											
Jaguar	Lorient Dy.	1923											
Leopard	St. Nazaire..	1924											
Lynx	,,	1925	393	36	..	..	2,360	50,000	35·5	5 5-in., 2 2·9-in. A.A., 21·7-in., torpedoes.	6	—	540
Panthère	Lorient Dy.	1924											
Tigre	Nantes ..	1924											
Amiral Sénès, *ex* S. 113	Germany ..	1918	360	36	14·8	2	2,380	56,000	36·9	4 5·9-in., 4 M.	4 dbl.	180	700
DESTROYERS—													
Adroit, Alcyon, Palme, Railleuse, Fortune, Mars	.. ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
Bourrasque	Dunkerque	1925											
Cyclone .. .. / Mistral	Havre ..	1925											
Orage .. .. / Ouragon	Caen	1924											
Simoun .. .. / Sirocco	St. Nazaire..	1924	326	31·7	..	2	1,430	30,000	33·5	4 5·1-in., 1 2·9-in. A.A., 21·7-in.; torpedo tubes.	6	140	350
Tempête	Nantes ..	1925											
Tramontane .. .. .. / Trombe	Bordeaux ..	1924											
Typhon	Harfleur ..	1925											
Tornade	Bordeaux ..	1925											
Bouclier	Normand ..	1911	237·0	24·9	9·4	3	790	13,000	35·33	2 3·9-in. 4 9-pr.	4	70	140
Carquois	Rochefort ..	1906	197·4	21·5	11·5	2	350	6,400	28	1 9-pr. 6 3-prs.	2	70	80
Casque	Havre(F.&C.)	1910	246·4	25	10·0	3	820	14,400	34·90	2 3·9-in. 4 9-pr.	4	70	160
Cavalier	Normand ..	1910	222·0	21·8	10·5	3	527	8,600	31·19	6 9-prs.	2	70	110
Cimeterre	Bordeaux ..	1911	243·4	26	10·0	2	894	13,500	31·15	2 3·9-in. 4 9-pr.	4	70	140
Fanfare	Normand ..	1907	196·8	21·7	11·5	2	350	6,400	28	1 9-pr. 6 3-prs.	2	70	80
Glaive..	Rochefort ..	1908	197·4	22·4	11·8	2	358	6,800	27·90	1 9-pr. 6 3-prs.	2	70	80
Lansquenet	Bordeaux ..	1909	221·0	20·8	10·0	3	542	8,129	28·8	6 9-prs.	3	71	100
Mameluck	Nantes ..	1909	216	22·8	10·0	2	407	7,750	30·5	6 9-prs.	3	71	100
Massue	Toulon ..	1908	197·4	21·7	11·4	2	350	6,800	28·4	1 9-pr. 6 3-prs.	2	70	80
Mortier	Rochefort ..	1906	197·4	21·5	11·5	2	350	6,400	28	1 9-pr. 6 3-prs.	2	70	80
Poignard	Rochefort ..	1909	197	22	11·5	2	358	6,800	28	1 9-pr. 6 3-pts.	2	70	80
Sape	S. de S. Nazaire	1907	197·4	21·5	11·5	2	350	6,400	28	1 9-pr. 6 3-prs	2	70	80
Spahi	Havre.. ..	1908	224	21·7	10	2	455	9,000	29·4	6 9-prs.	3	71	100
Trident	Rochefort ..	1907	197·4	21·5	11 5	2	350	6,400	28	1 9-pr. 6 3-prs.	2	70	80
Com. Bory, Francis Garnier, Com. Rivière, Capt. Mehl, Deborter (5) ..	Normand, &c.	1912	253·6	25·4	10·0	3	780	14,100	31	2 3 9-in., 4 9-prs.	4	84	140
Bisson .. .. Protet, Magon, Comm. Lucas, Mangini (4) ..	Toulon, etc.	1912 & 1913	271·4	26	10·0	3	800–850	15,000	31	2 3·9-in., 4 9-prs.	2 dbl.	84	140
Enseigne Henry, Aspirant Herbert (2)	Rochefort ..	1911 & 1912	221	21·6	10·3	2	475	7,500	28·5	6 9-prs.	3	70	100
Ens. Roux, M. P. Lestin	Rochefort ..	1915–1920	271	28	10·0	2	880	17,000	30	2 3·9-in., 4 9 prs.	3 dbl.	81	200
Ens. Gabolde	Havre	1921	271	26·9	10·0	2	900	20,000	32·5	3 3·9-in. 1 14-pr.	4	..	200
Buino, *ex* V. 130	Germany ..	1917	269	28	10·0	2	1,150	25,000	34·7	3 4-in., 2 M., 24 mines.	6	..	360
Rageot de la Touche, *ex* H. 146	Germany ..												
Delage, *ex* H. 147	Germany ..	1917	279·8	27·4	10·0	2	1,110	23,800	33·3	3 4-in., 4 M., 40 mines.	6	..	330
Deligny, *ex* S. 139	Germany ..												
Chastang, *ex* S. 133	Germany ..												
Vesco, *ex* S. 134	Germany ..	1917	272·3	27·3	10·0	2	1,030	24,000	33·7	3 4-in., 4 M.	6	..	300
Mazare, *ex* S 135	Germany ..												
P. Durand, *ex* V. 79 ..	Germany ..	1915	269	28	10·0	2	1,170	23,000	30·2	3 4·1-in., 4 M., 24 mines.	6	..	300
Matelot Leblanc, *ex* Dukla	Fiume ..	1916	277	25·7	10·0	2	836	17,000	32·5	2 3·9-in., 6 smaller.	4	102	..
Téméraire, Intrépide, Opiniâtre, Aventurier	Nantes ..	1911	290	28·5	9·0	..	950–1200	18,000	32	4 3·9-in. 2 3-prs. A.A.	4	102	330
Annamite, Algérien, Arabe, Bambara, Hova, Kabyle, Marocain, Sakalave, Sénégalais, Somali, Tonkinois, Touareg ..	Japan	1917	272	24	10·0	..	685–830	10,000	29	1 4·7-in., 4 12-prs.	2 dbl.	87	220

15 additional flotilla leaders of an improved "Jaguar" type will be laid down during 1925–1929.
18 additional destroyers of "Adroit" type projected. To be laid down between 1925 and 1929. Will probably be armed with 5·5-in. guns

France—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement. Surf-sub.	Indicated Horse-Power.	Maximum Trial Speed. Surf-sub.	Armament.	Torpedo Tubes.	Complement.
SUBMARINES—			Feet.	Feet.	Feet.		Tons.		Knots.			
Redoubtable Vengeur	Cherbourg	Bldg	..	..	..	..	1363	..	18-10	1 3·9-in.	10	..
Requin Morse Narval Souffleur Caiman Dauphin Espadon Marsouin Phoque	Cherbourg Toulon Brest	1924 1925 1925 1924 Bldg. 1925 Bldg. 1924 Bldg	256·5	21·5	15	2	1130-1415	2900- 1800	16-10	1 3·9-in.	10	..
Ariane Ondine Danaé Eurydice	Havre	Bldg.	216·5	16	11·5	2	590-758	1250- 1000	14-9·5	1 3·9-in. A.A.	7	..
Circé Calypso Doris Thetis	Chalons	Bldg.	204·5	17·5	11	2	590-758	1250- 1000	14-9·5	1 3·9-in. A.A.	7	..
Naïde Sirène Nymphe Galatée	St. Nazaire	Bldg.	210	17	11·5	2	590-750	1300- 1000	14-9·5	1 3·9-in. A.A.	7	..
Brumaire, Frimaire Euler	Cherbourg	1911 1912	171	18·0	10·3	2	398-550	700	13-9	..	7	24
Newton Curie, Le Verrier	Rochefort Toulon	1912 1912 1912	168	16·4	10·3	2	398-550	840	13-9	..	7	24
Clorinde, Cornélie, Amphitrite, Astrée Artemis, Aréthuse, Atalante, Amaranthe, Andromaque	Rochefort Toulon Cherbourg	1913 1914 1913 1913 1913	174	16·9	10·9	2	410-560	1,300	14-8	..	8	30
Néréide	Cherbourg	1914	243	19·8	13·8	2	800-1000	2,400	16-10	1 14-pr.	8	40
Bellone, Hermione, Gorgone	Rochefort Toulon	1914 & 1915	198·9	17·7	11·9	2	520-790	1,800	16-9	1-3 pr. ..	8	29
Gustave Zédé	Cherbourg	1913	243	19·7	13·8	..	850-1100	2,900	16-10	1 14-pr. 1 3-pr.	8	40
Daphne	Cherbourg	1915	223	18·0	12·0	2	749-900	1800- 1600	15-11	1 75-mm., 1 M.	10	40
Joessel, Fulton	Cherbourg	1917	243	20·0	13·4	2	915-1200	2900- 1650	16¼-11	2 14-pr. ..	8	40
Laplace Lagrange Romazzotti, Regnault	Rochefort Toulon Toulon	1917 1917 1918	247	21·0	13·0	2	840-1317	2,600	16½-11	2 14-pr. ..	8	..
Amazone, Antigone, Armide	Schneider	1916	184·6	17·0	10·6	2	467-665	2,000	17¼-11	1 1-pr., 1 M.	6	..
O'Bryne, L. Dupetit-Thouars, Henry Fournier,	Chalons	1919 & 1920	172	15·6	9·6	..	335-502	1020- 460	14-8	1 3-pr. ..	4	24
Dupuy de Lôme, Sané	Chalons	1916	246	20·9	13·7	..	854-1291	2900- 1640	..	2 14-pr. ..	8	40
Pierre Chailley	Havre	1922	229·7	24·7	13·3	..	886-1181	1800- 1400	13·5-9	1 12-pr., 2 M. 40 mines	4	43
Maurice Callot	Bordeaux	1921	247·8	22	12·3	..	920-1270	2900- 1600	16½-10	1 14-pr., 2 M. 27 mines	6	..
Roland Morillot (*ex*-U.B. 26)	Germany	1916	118·6	15	12	2	260-318	284- 280	8·5-6	1 3-pr., 1 M	2	23
Pierre Marrast (*ex*-U. 162) Jean Roulier (*ex*-U. 166)	,,	1918	235	21	12·7	2	820-1020	2400- 1200	16-8·5	1 4-in., 1 M	6	40
Halbronn (*ex*-U. 139)	,,	1918	302·2	29·5	15·5	2	2000-2516	3300- 1780	13·6- 7·7	1 5·9-in.	6	80
Jean Antric (*ex*-U. 105) Leon Mignot (*ex*-U. 108)	,,	1917	285	21	12·5	..	835-1038	2400- 1200	16·5- 8·5	1 4 1-in., 1 M.	6	40
Jean Corre (*ex*-U.B. 155) Carissan (*ex*-U B. 99) Trinité Schillemans (*ex*-U.B. 94)	,,	1917 1918	181	19	12	..	1060-760	1100- 760	12-7·5	1 4·1-in., 1 M.	5	34
René Audry (*ex*-U. 119)	,,	1917	267·5	24	14	..	1181-1525	2400- 1200	14·5- 7·2	1 5·9-in., 42 mines	4	40
Victor Réveille (*ex*-U. 79)	,,	1916	200	19	16	..	797-877	1300- 800	10-8	1 4·1-in., 36 mines	2	..

French submarines are now divided into two classes :—

1st class.—All vessels of 850 tons and above in the surface condition, including the U minelayers.

2nd class.—All smaller vessels.

In addition, 2 cruiser submarines, 28 1st class submarines, and 6 minelaying submarines are projected, to be laid down between 1925 and 1929. It is also proposed to lay down 3 2nd class submarines each year.

Germany.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
DESTROYERS—			Feet.	Feet.	Eeet		Tons.		Knots.				Tons.
One in No.		Bldg.	..	..	..	..	773	..	..	4 4·1-in.	4	..	..
S. 23	Shichau Elbing	1913	234·6	24·6	10							75	Coal 135 Oil 55
S. 19													
S. 18													
G. 11..	Germama Works, Kiel	1911 | 1912	233	25	9·8		555	15,000	32·5			73	Coal 140 Oil 60
G. 10..													
G. 8													
G. 7													
V. 6	Vulcan Works, Stettin	1913	233	25	9·8		561	15,000	32·5	4 4·1-in.	4	73	Coal 140 Oil 60
V. 5		1913											
V. 3		1911											
V. 2		1911											
V. 1		1911											
T. 196	Kiel	1911	213	26	10		638	16,000	32·5				
T. 190	Vulcan Works,	1910					646	16,000	32·5				
T. 185	Stettin						626	16,000	32·5				
T. 175	Kiel	1910					643	16,000	31·5				

Greece.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			**Feet.**	**Feet.**	**Feet.**		**Tons.**		**Knots.**				**Tons.**
Thyella .. .. .. Sphendoni .. .. Lonchi	**Yarrow ..**	**1906**	**220**	**20·6**	**6·0**	**2**	**350**	**6000**	**31·79 31·84 32·53**	**2 12, 4 6-pr.**	**2**	**70**	**80**
Smyrna (*ex* Austrian Ulan)	**Trieste**	**1907**	**220**	**20**	**6·6**	**2**	**400**	**6000**	**28**	**4 11-pr., 2 11-pr., A.A.**	**2**	**86**	**90**
Nike.. .. .. .. Aspis .. .. Velos	**Stettin (Vulcan)**	**1906**	**220**	**20·6**	**7·2**	**2**	**350**	**..**	**30**	**2 12, 4 6-pr.**	**2**	**58**	**80**
***Aetos, Leon, *Panthir, Jerax ..**	**Birkenhead**	**1911**	**293**	**27·7**	**9·6**	**..**	**980**	**19,750**	**32**	**4 4-in., 1 6-pr., A.A.**	**4**	**110**	**225**

Six 125-ton torpedo-boats built by the Vulcan Co. at Stettin: Arethusa, Doris, Aigli, Dafni, Alkyonis, Thetis, 25 knots.
The surrendered Austrian torpedo-boats: Pergamos, 92 F, 94 F, Proussa, 99 M and 100 M, 250 tons, have been added to the Greek Navy for police duties.
Orders have been placed for two submarines of 590-700 tons with the French firm of Schneider-Creusot.
*** Reconstructed by Messrs. J. S. White & Co., Cowes, 1924-25.**

Italy.

Name or Number.	Where Built	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
			Feet	Feet.	Feet.		Tons		Knots				Tons
FLOTILLA LEADERS *—													
Alessandro Poerio, Gulielmo Pepe	Genoa (Ansaldo)	1914	279	26·3	9·3	2	910	20,000	32	5 4-in., 2 2-pr., A.A.	2 dbl.	100	400
Cesare Rossarol, ex-German B97	Hamburg	1915	321	30·9	9·9	2	1354	40,200	37·5	3 4·7-in., 24 mines, 2 14-pr., A.A.	6	..	526
DESTROYERS—													
Borea, Zeffiro, Espiro, Ostro, Aquilone, Turbine, Nembo, Euro	Ansaldo, Genoa; Odero, Genoa; Genoa Docks Co.	Bldg.	305	30·2	10·6	..	1355	..	36	4 5-in.	6	..	..
N. Sauro, C. Battisti, F. Nullo, D. Manin	Quanaro, Fiume	Bldg.	..	..	..	..	1300	30,000	35	4 4·7-in., 30 mines	6	.	..
Francesco Crispi, Giovanni Nicotera, Bettino Ricasoli, Quintino Sella	Naples (Pattison)	Bldg.	271	28	10	..	1024	28,000	36	3 4·7-in.	6 18-in. or 4 23·4-in.	106	220
Alpino, Corazziere, Pontiere, Carabiniere, Fuciliere	Genoa (Ansaldo)	1909, 1910	211·6	20·0	7·6	2	420	6,500	28·5	4 14-pdr.	3	55	82
Impavido, Indomito, Insidioso, Irriquieto	Naples (Pattison)	1912 & 1913	246	24·0	8·4	2	650	15,000	35·2	5 4-in., 2 2-pr., A.A.	2	71	110
Ardito, Ardente	Orlando (Leghorn)	1912 & 1913	238	24·0	8·4	2	680	15,000	33·4	5 4-in., 2 2-pr., A.A.	2	71	110
Ascaro	Ansaldo	1912	211·5	20·0	7·0	2	390	6,000	29	2 14-pr. 4 6-pr.	3	50	80
Giuseppe Sirtori, Vicenzo Orsini, Francesco Stocco, Giovanni Acerbi	Genoa (Odero)	1916, 1917, 1916, 1916	238	24	9·0	2	800	17,000	33	6 4-in., 2 2-pr., A.A. Carries 10 mines.	4	100	150
E. Cosenz, Giacoma Medici, G. La Farina, Nicola Fabrizi, Angelo Bassini, Giacinto Carini, G. La Masca	Genoa (Odero)	1918, 1917, 1918, 1917, 1917, 1917, 1917	238	24	9·0	2	800	17,000	33	4 4-in., 2 12-pr., 2 M. Carries 10 mines.	4	100	150
Fratelli Cairoli, Antonio Mosto	Naples (Pattison)	1914, 1914						14,500	30·8				
Rosolino Pilo, Giuseppe Abba, Ippolito Nievo, Simone Schiaffino, Giuseppe Dezza, Giuseppe Missori	Genoa (Odero)	1914; 1915	236	24	8·8	2	750	17,000	32	5 4-in., 2 2-pr. A.A.	4	71	150
Gen. A. Cantore, Gen. A. Chinotto, Gen. A. Papa, Gen. A. Cascino, Gen. M. Prestinari, Gen. C. Montanari	Genoa (Odero)	1921, 1922	238	24	9·0	2	800	18,000	33	4 4-in., 2 14-pr.,	4	100	150
Audace	Yarrow	1918	275	27·6	8·3	2	955	21,500	36	1 4-in. 6 3-in.	2 dbl.	111	252
Ardimentoso, ex-S. 63	Schichau	1915	274	27·3	8 6	2	908	23,000	31·5	3 4·1-in.	6		305
Solferino, Palestro, S. Martino, Curtatone, Confienza, Castelfidardo, Calatafimi, Monzambano	Leghorn (Orlando)	1921, 1922, 1923	270, 280	26·5	8 6	2	927	27,000	32	4 4-in., 2 12 pr., A.A.	4, 6	..	170

In addition to the above, eight new destroyers are projected, to be laid down 1925–1928.

*** For eight scouts, intended also to act as flotilla leaders, see the Italian light-cruiser list, pp. 362, 363.**

Italy—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
DESTROYERS—*contd.*													
Cortellazzo .. Fasana .. Grado .. Monfalcone .. Muggia .. Pola .. Zenzon ..	Danubius *ex*-Austrian	1916 1920	275	25·5	8	2	850	20,600	32·5 33	2 3 9-in. 4 3-in. 2 3-in., A.A.	4	102	95
FIRST CLASS TORPEDO BOATS—													
Calipso .. Climene ..	Naples (Pattison)	1909 1909	164·3	17·4	7	2	120	3,100	26·0	2 14-prs.	2	35	30
P.N., 1-4, 6-12, 33-38, 40-45, 64, 65, 69-71 .. A.S., 25-30, 52-57 .. O.S., 13-16, 18-24, 27, 28, 30, 47-51	Pattison .. Ansaldo .. Odero	1912 & 1913 1914	139	13·9	5·5	2	130	2,500	27	1 6-pr.	2	..	15
O.L., 58-63 .. O.L.T., 74, 75 ..	Orlando .. Orlando ..	1916 1920	139	13·5	5·5	2	157	3,000	27-29	2 14-pr. A. A.	2	..	25
C.P., 76-79	Palermo ..	Bldg.	154	..	..	..	..	3,000	..	2 14-pr., A.A.	1 dbl.	..	..
SUBMARINES—													
Ballila .. A. Sciesa .. E. Toti .. D. Millelire ..	Spezia, Ansaldo	Bldg.	282·2	24·6	14·1	..	1300/1600	..	18-10	1 4·7-in.	6 21-in.	..	..
V. Pisani .. M. Colonna .. Speri .. G. Bausan ..	Monfalcone	Bldg.	223	18·7	13 8	..	805/950	..	17·5–9	1 4-in.	6 21-in.	..	..
Masaniello .. P. Capponi .. Da. Geneys .. G. Da. Procida ..	Taranto ..	Bldg.	213·3	21·3	..	..	780/930	..	17·5-9	1 4-in.	6 21-in	..	..
L. Galvani, E. Torricelli, P. Micca ..	Spezia												
L. Mocenigo .. L. Marcello .. A. Emo ..	Venice	1917 1919	207·5	20·3	15·6	..	830 1000	2600	15 9·5	2 3-in. A.A.	6 18-in.	..	..
A. Barbarigo .. A. Provana .. S. Veniero .. G. Nani ..	Spezia, F.I.A.T.		218·0	19·0	15 6	..	740 920	1230	17-9·2				
X 2, 3	Ansaldo ..	1917	139·9	18	11	..	400/460	660/320	9·2-6·3	1 3 in. A.A. 18 mines	2 18-in.	..	14½
H 1 to 4, 6 to 8 ..	Vickers ..	1917	150	16	12	..	360 440	480 320	12-8·9	1 3-in. A.A.	4 18-in.	22	14
F 1, 2, 5, 6, 7, 9, 10, 12-21	F.I.A.T. .. Odero .. Orlando ..	1913 1917 1918	148	14	10	..	260 380	700 320	13·6-7·5	1 3-in. A.A.	2 17·7 in.	22	12
Argonauta	Ansaldo ..	1915	148·3	13·9	9-1	..	250 300	700 250	13 9	1 3-in. A.A.	2 18-in.	21	..
N 1 to N 4 .. N 5, N 6	Ansaldo .. Taranto ..	1917 1918 1917	150	14	9-9	..	270 350	700 320	13·6-8	1 3-in. A.A.	2 18-in.	21	9

Eight additional submarines are projected but not yet authorised.

Japan.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
DESTROYERS: FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Nos. 11 13, 25 17, 19 21, 23 27	Uraga Ishikawa-jima Sasebo Maizura Fujinagata	1924–25	320	30	9·6	..	1400	38,500	34	4 4·7-in., 2 M. A.A.	6	..	..
1, 3 5, 7, 9 15	Nagasaki Maidzura Fujinagata	1922–23 1922–24 1924	320	30	9·6	..	1400	38,500	34	4 4·7-in., 2 M. A.A.	6	..	..
Umikaze, Yamakase	Maidzuru and Nagasaki	1910–11	310·0	28·0	9·0	3	1150	20,500	33	2 4·7-in., 5 12-pr.	4	139	430
Amatsukaze Tokitsukaze Isokaze Hamakaze	Kure and Nagasaki	1916	310·0	28·0	9·3	3	1227	27,000	34	4 4·7-in., 2 M. A.A.	6	145	340
Tanikase Kawakase Sawakase Okikase, Shimakase, Nadakase, Yakase, Hakase, Minekase	Maidzuru Yokosuka Nagasaki Maidzuru	1916–19	320	29·3	9·5	2	1300 1300 1345	38,000	34	3 4·7-in., 2 M. 4 4·7-in., 2 M.	6 6	128 145	.. ..
Suzukase, Soyokase, Tsumujikase, Makase, Okase, Namikase, Numakase, Nokase, Tashikase, Shiokase, Hokase, Yukase, Akikase	Mitsubishi, Kawasaki, Maidzuru	1920–2	336·5	29·25	9·5	2	1345	38,500	34	4 4·7-in. 2 M. A.A.	6	..	..
SECOND CLASS—													
Nos. 2, 4 6, 16, 18 10, 12 8	Kawasaki, Kobe Fujinagata Ishikawa-jima Uraga	1922 1923 1922–23 1923	275·5	26	8	..	900	21,000	31·5	3 4·7-in., 2 M. A.A.	4	..	..
Sakura, Tashibana	Maidzura	1912	274	24·0	7·9	3	600	9,500	30	1 4·7-in. 4 12-pr.	4	92	230
Kaba Kaede Kashiwa Katsura Kiri Kusunoki Matsu Sakaki Sugi Ume	Yokosuka Maidzuru Nagasaki Kobe Uraga Sasebo and Osaka	1915	274·0	24 0	7·9	2	665	9,500	30	1 4·7 in. 4 12-pr.	4	92	230
Momo, Yanagi Kashi, Hinoki	Sasebo Maidzuru	1916-17	275·0	25·0	7·9	2	835	16,000	31·5	3 4·7 in., 2 M.	6	109	300
Nara Kuwa, Tsubaki Maki, Keyaki Enoki Momi, Take Nashi, Kaki Kaya, Kure Nire, Tsuga	Yokosuka Kure Sasebo Maidzuru Maidzuru, etc.	1917–18	275·0	26·0	8·0	2	835 900	21,000	31·5	3 4·7 in., 2 or 3 M., A.A.	4 or 6	110	..
Urakaze	Yarrow	1915	275 3	27·6	9·5	2	955	22,000	28	1 4·7-in., 4 12 pr.	4	117	248
Kiku, Aoi, Hagi, Susuki, Fuji, Tsuta, Hishi, Hasu, Ashi, Warabi, Sumire, Tade, Yomogi	Kobe, Uraga, Ishikawa-jima, Fujinagata, Kawasaki	1920–1922	275·5	26	8	2	850	21,000	31·5	3 4·7 in. 3 M., A.A.	4	110	..

In addition to the above fifteen 1st class destroyers are authorised to be laid down.

Twenty 3rd class destroyers of 375 tons, 6,000 shaft h.p., and 30 knots, carrying 6 12-pr. and 2 T.T. All these vessels were completed 17 to 20 years ago.

Japan—*continued.*

Name or Number.	Where Built.	Completed.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement	Fuel Capacity.
SUBMARINES—			Feet.	Feet.	Feet.		Tons.		Knots.				Tns.
I.'s 21, 58, 53, 1, 2, 3, 54, 55	..	Bldg.	..	..	..	..	over 1000	..	..	..	..	..	..
Ro.'s 64, 65, 31, 68	..	Bldg.	..	..	..	..	under 1000	..	..	..	..	..	..
I. 51, 52	..	1924	..	..	..	..	1500/—	6000/—	..	..	..	..	..
Ro 63, 62, 61 .. 60	.. ..	1924 1923	..	..	..	..	1050/1500	..	..	..	..	..	..
Ro. 32, 30 .. .. 29	.. ..	1924 1923	..	..	..	..	770/1000	..	..	..	..	..	..
Ro. 28 .. .. .. 27 .. .. .. 26	.. .. ..	1923 1924 1922	..	..	..	..	750/1000	2600/1200	17/10	1 12-pr. 1 6-pr.	6 21-in	..	..
Ro. 59 .. .. .. 58, 57	.. ..	1923 1922	..	..	..	..	900/1082	2400/1200	17/10·5	1 12-pr. 1 3-pr.	4 21-in	..	..
Ro. 25, 19, 18, 17 .. 24 .. .. .. 23 .. .. .. 22, 21, 20, 16 ..	.. ..	1921 1920 1923 1922	..	..	..	..	740/1100	2600/1200	18/10	1 12-pr. 1 3-pr.	6 18-in.	..	..
Ro. 3, 4, 5	..	1922	..	..	..	..	700/1760	2600/1200	18/10	1 12-pr. 1 3-pr.	5 18-in.	..	..
Ro. 56, 55 .. .. 54, 53 .. .. .. 52, 51	.. .. ..	1922 1921 1920	..	..	..	..	900/1082	2400/1200	17/10·5	1 12-pr. 1 3-pr.	6 18-in.	..	..
Ro. 15, 14 .. .. 13	.. ..	1921 1920	..	..	..	..	740/986	2600/1200	17/10	1 12-pr. 1 3-pr.	6 18-in.	..	..
Ro. 12, 11	..	1919	..	..	..	..	720/1035	2600/1200	18/10	1 12-pr. 1 3-pr.	6 18-in.	..	..
Ro. 1, 2	..	1920	..	..	..	..	700/1072	2600/1200	18/10	1 12-pr. 1 3-pr.	5 18-in.	..	..
Ha. 9 .. .. .. 10	.. ..	1920 1916	..	..	..	..	450/670	2200/800	17/10	4 dropping gear	2 18-in.	..	..
Ha. 7, 8	..	1916	..	..	..	..	270/300	600/350	13/8	..	4 18-in.	..	..
Ha. 6	..	1912	..	..	..	..	300/330	1000/300	14/8	..	2	..	..
Ha. 3, 4, 5	..	1911	..	..	..	..	290/320	600/300	12·75/7·75	..	2	..	..
Ha. 1, 2	..	1908	..	..	..	..	285/315	600/180	12·9/7·8	..	2	..	..

16 additional submarines are authorised to be built.

N.B.—The Japanese submarines were renumbered on 1st November, 1924.

Netherlands.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
*De Ruyter .. .. / *Evertsen	.. .. ..	Bldg.	307 p.p. 322 o.a.	31·2	..	..	1620	..	34-36	4 4·7-in. 2 3-in. A.A.	6 21-in.	.	..
Two others													
Wolf, Fret (1909) .. / Bulhond, Jakhals (1910) / Hermelijn, Lynx, Panter, Vos (1911)	Flushing .. Rotterdam	1910–1913	230	22	9	2	510	8,500	30	4 13-pr., 4 M.	2	84	120
FIRST CLASS—													
Zeeslang, Krokodil, Draak, Hydra,	Flushing ..	1905	152·6	15·3	7·9	1	104	1200–1560	27	2 1-prs.	2	20	20
G 13–15–16	Scheldt .. / Fijenoord ..	1913–1914	162·5	17·3	9·0	..	180	2,600	26	2 13-pr.	3	25	40
Z 1–4..	Amsterdam	1916–1917	201	20·4	6	2	322	5,500	27	2 13-pr., 2 M.	4	39	70
Z 5–8..	Scheldt .. / Fijenoord ..	1915	192	19·8	5·5	2	310	5,500–5,700	27	2 13-prs., 2 M.	4	39	81

The named destroyers and first-class boats belong to the forces of the Dutch Indies. The other torpedo-boats are in Holland.

SUBMARINE boats.—O 2 and 3, 132–150 tons, 11·8 knots, 2 tubes. O 4 and 5, 350 tons, 151 ft. 6 in. long, 16 knots (surface), 11 knots (submerged) speed. O 6 and 7, built in Holland, 178–234 tons. British interned submarine bought by the Dutch Government and taken over as O 8, June, 1917; O 9–11 building. M 1 submarine mine-layer. K submarines for the East Indies: K 1, 320–380 tons, 3 tubes; K 2–7, 560–700 tons, 1 2·9-in.; 1 M., 6 tubes, 16·10 knots; K 8–10, 570–700 tons, 1 3·4-in., 1 M., 4 tubes; K 11–13 building and O 9–14 building or projected.

* These vessels are to the design of Messrs. Yarrow, and will be built under their supervision in the Netherlands. Messrs. Yarrow obtained the contract in competition with French, German, and American firms.

Norway.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Draug, Troll, Garm	Horten ..	1908–13	226	23·5	8·8	2	540	7,500	27·0	6 12-pdrs.	3	71	95
FIRST CLASS—													
Snoegg, Stegg, Trygg	Horten ..	1919–1920	173·9	18	5½	2	220	3,500	25	2 12-pdr.	4	31	30
SECOND CLASS—													
Hval, Delfin	Elbing ..	1896–	130·0	15·0	6·9	1	84	1,100	24·5	2 1·4-in. Q.F.	2	19	17
Storm, Brand, Trods	Horten ..	1900	128·0	15·0	..	1	84	1,100	23	2 1·4-in. Q.F.	2	19	17
Laks, Sild, Sael, Skrei	Horten ..	1901	128·0	15·0	6·9	1	84	1,100	23	2 1·4-in.	2	19	17
Kjek, Hvas, Dristig, Kvik, Djerv, Blink,	Fredrikstad	1898	111·5	14·5	6·3	1	65	650	19	2 1·4-in.	2	..	..
Lyn, Hauk, Falk, Glimt	Horten ..	1903											
Skarv, Teist, Lom, Jo, Grib	Horten ..	1906–7	134·5	14·9	..	1	100	1,700	25·0	2 3-pr.	2-3	18	16
Ravn, Orn	Horten ..	1903	119	14·9	6·4	1	73	1,035	22·5	2 1·4-in.	2	16	15
Kjeld..	Horten ..	1912	135	14·9	6·4	1	100	1,800	25	1 12-pr.	3	19	16
SUBMARINES—													
A 1, 2, 3, 4	Germania Kiel	1909 to 1913	131·6	14·9	9·6	2	220 / 255	440 / 250	12 / 9	..	3	17	..
B 1, 2	Horten ..	1922	167·3	16·5	9·5	..	413–545	..	15–11	..	..	..	..
B 3, 4	Horten ..	1923–24											
MINING VESSELS:—													
Froeya	Horten ..	1917–	250	27	8½	2	755	..	22	4 4-in.	2	80	95
Glommen, Laugen..	Christiania..	1918	138	28	6½	2	335	350	9·5	2 12-pdr.	..	39	21

Russia.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Korfu Zante Terigo	Ship & Eng. Co., Nikolaev	1917	303·5	29·5	9	..	1326	29,000	33	3 4-in., 1 2-pr., 2 M., can carry 80 mines	12	..	390
Karl Marx	Revel	1915	344·5	31·3	9·7	..	1350	32,700	35	4 4-in., 1 2-pr., 2 M., 80 mines	12	..	..
Mikhail	Revel	1915	314·75	30·5	9·75	..	1260	30,000	35	4 4-in., 1 2-pr., 2 M., 80 mines	12	..	..
Orphei Uritsky	Leningrad	1914–1915	321·5	30·5	9·25	..	1610	32,000	35	..	9	110	400
Volodarski Letun Engels Stalin Zinoviev Trotsky Lenin	Leningrad	1914–1915	314·75	30·5	9·75	..	1260	30,000	35	4 4-in., 1 2-pr., 2 M., 80 mines	12	110	350
Bezpokoini Gnyevni Derski	Nikolaev	1913-14	..	..	..	..	1088	25,500	34	3 4-in., 2 3-pr., 4 M.	10	..	..
Pospyeshni Buistri Puilki	Leningrad	1913–14	..	..	..	..	1100	23,000	34	3 4-in., 2 3-pr., 4 M., 80 mines	10	..	..
SUBMARINES—		†											
Ag 26	..	1924	..	..	..	..	355/467	480/320	13/11	1 6-pr.	4	..	..
Ag 25 Ag 24 Ag 23	..	1922 1922 1920	..	..	..	..	375/467	480/320	13/11				
*Ag 22	..	1919	..	..	..	..	..	..	..	1 4-in., 2 M.	6	..	..
Kommunist	..	1917	..	..	..	..	260/400	..	13/7·5	..	..	..	..
Proletary Yaz	..	1916 1917	..	..	..		..	2640/900	16/9	1 6-pr., or 2 6-pr., 1 M.	4	..	..
Forel	..	1917	..	..	..		..	840/900	11/9	42 mines	4	..	..
Rabotchky	..	1917	..	..	..		..	2640/900	16/9	42 mines	4	..	..
Volk Vepr	..	1916 1915	..	..	..		..	500/840	10/9	2 6-pr., 1 1-pr.	4	..	..
*Tyulen Politnik	..	1915 1913	..	..	..		650/784	500/1400	10/11·7	1 4-in., 1 2-in., 2 M.	4	..	..
*Utka	..	1916	..	..	..		..	500/900	10/9	2 11-pr., 1 1-pr., 1 M.	4	..	..
*Burysevyestnik	..	1918	..	..	..		..	2640/900	16/9	1 11-pr.	4	..	..
Kuguar	..	1917	..	..	..		..	2600/900	16/9				
Krasnoarmeyets Komissar Bolshevik Komunar Tovaristch Krasnoflotetz	..	1917 1916 1916 1916 1916 1916	..	..	..		..	500/900	10/9	2 6-pr., 1 1-pr., 1 M.	4	..	..
Minoga	..	1908	..	..	..	..	117/177	480/140	11/5	1 1-pr.	2	..	..
Okun Makrel Kasatka	..	1907 1907 1904	..	..	..	..	150/200	120/100	7·5/5	Torp. dropping gear	..	..	..
Delphin	..	1903	..	..	..	..	115/150	..	..	..	..	..	..

In addition to the above there are fifty-eight older destroyers completed from 1895 to 1909 of very little if any fighting value.

There are also twenty-five boats in various stages of completion, which it is very unlikely will ever be completed, with the exception of one—the Lefkos, of 1326 tons, 29,000 I.H.P., armed with 4 4-in., 1 2-pr., 2 M., 12 T.T.'s, and 80 mines.

Three new submarines are projected. No details available.

Many of the above vessels are known to be practically useless until very extensively repaired and refitted.

*** These ships are still at Bizerta, under French protection, but are about to be handed over to the Soviet Government.**

† Dates are completion dates.

Spain.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FLOTILLA LEADERS—													
Churraca .. .. .. Alacala Galiano .. Sanchez-Barcairtegui		Bldg.	320	31·8	10·5	2	1,650	42,000	36	5 4·7-in. 1 14-pr. A.A.	6	..	510
DESTROYERS—													
Alcedo .. .. Velasco .. .. Juan Lazaga	Cartagena ..	1922 1923 1924	275	27	10·5	2	1,145	33,000	34	3 4-in., 2 2-pr. A.A.	4	..	265
Terror, Audaz.. ..	Clydebank ..	1896 1897	220 229	22	9·9	2	457	6,000 7,950	29	2 14-pr. 2 6-pr. 2 1-pr.	2	74	100 93
Osado, Proserpina ..	Clydebank ..	1897	229	22	9·9	2	457	7,500	30	2 14-pr. 2 6-pr. 2 1-pr	2	74	90
Bustamente .. .. Villaamil .. .. .. Cadarso	Cartagena .. Cartagena .. Cartagena ..	1913- 1915	220	22	5·6	..	364	6,250	28	5 6-pr.	2	70	80
TORPEDO BOATS—													
22 boats	Cartagena ..	1913- 1922	164	16·5	4 9	3	177	3,750	26	3 3-pr.	3	..	..
SUBMARINES—													
C 1-6	Cartagena ..	Bldg.	..	..	..	..	910/1290	..	16/9	1 3-in. A.A.	6 21-in.	..	..
B 1-6	Cartagena ..	1921-24	208	17·9	11·25	..	560/830	1400/850	16/10·5	1 3-in.	4 18-in.	..	..
A 1-3	Spezia, Italy	1917	149·6	13·5	10·2	..	260/380	600/450	13/8·5	..	2	..	..
Isaac Peral	Fore River Co., U.S.A.	..	197	19	11	..	488/750	1100/580	15/10	1 3-in. A.A.	4	..	..

Sweden.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Mode	Yarrow ..	1902	220·3	20 6	8·9	2	480	6,800	32·4	6 6-prs.	2	67	95
Magne .. .. Wale.. .. .. Ragnar .. .. Sigurd .. .. Vidar .. .. Hugin .. .. Munin	Thornycroft Malmo .. Malmo .. Gothenburg Malmo Gothenburg Malmo ..	1905 1906 1909 1909 1909 1909 1910	216·9	20·8	8·2	2	480	8,000- 9,000	30·0	4 14-prs. 4 6-prs.	2 dbl.	67	90
Wrangel .. .. .. Wachtmeister.. ..	Gothenborg	1917	230	22	9·2	2	500	12,000	34·0	4 14-prs.	2 dbl.	..	10
TORPEDO-BOATS—													
Plejad, Castor, Pollux	Normand & Carlskrona	1905- 1909	125	14·4	6·6	1	106	1,900	26	2 1·5-in. Q.F.	2	18	20
Vega .. .. Vesta	Carlskrona..	1909	128	14·4	8·6	1	105	1,900	25	2 6-prs.	2	18	20
Spica, Astrea, Iris, Thetis	Bergsund and Gothenburg	1909	128	17·5	8·6	1	120	1,900	25	2 6-prs.	2	18	20
Altair .. .. Antares .. .. Argo .. .. Arcturus	Stockholm ..	1908	128	17·5	8·6	..	110	2,000	25	2 6-prs.	2	18	20
Perseus, Polaris .. Regulus, Rigel ..	Bergsund .. Stockholm ..	1910- 1915	128	14·4	8 6	1	115	2,000	25	2 6-prs.	2	18	20

Also ten small torpedo-boats, 60 tons, built 1907-1908.

Submarines: Bävern, Valrossen, Illern, Uttern, Sälen, Valen, 460 tons (1920-21), Hajen, 107-127 tons (1920), Gädden, Braxen, Laxen, Aborren, 200 tons (1915-16), Delfinen, 250-270 tons, one M., 2 T.T. (1915), Tumlaren, Svaerdfisken (1914), 250-370 tons. Nos. 2-4 (1904-10). Details of the Swedish submarines are given under reserve. The facts are confidential. The new programme includes additional submarines.

Two new destroyers have been authorised They will be about 950 tons displacement and have a speed of 35 knots. Armament: 3 4·7-in., 6 T.T. in triple mountings. Two motor torpedo boats have also been ordered from Messrs. Thornycroft.

United States

No destroyers are, at the present time, building for the United States Navy, but twelve have been authorised. The oldest class, 21 in number, date from 1910–12, and will probably soon be removed from the list. They are 21-knot boats of 742 tons, and 12,000 H.P., five 13-prs. and three double 18-in. T.T. Their names are:

Paulding, Drayton, Roe, Terry, Perkins, Sterett, McCall, Burrows, Warrington, Mayrant, Monaghan, Trippe, Walke, Ammen, Patterson, Fanning, Jarvis, Henley, Beale, Jouett, Jenkins.

The next class (1913–16), 19 in number, of 1020–1150 tons and 16,000–18,000 H.P., 29–30 knots, mount four 4-in. guns, and have four double 18-in. or 21-in. T.T. They are:

Cassin, Cummings, Downes, Duncan, Aylwin, Parker, Benham, Balch, O'Brien, Nicholson, Winslow, McDougal, Cushing, Ericsson, Tucker, Conyngham, Porter, Wadsworth, Wainwright.

A very extensive class follows (1916–20), comprising 121 vessels. The displacement approximates 1,185 tons in the later boats, the H.P. increases to 27,000, and the speed, from the Ringgold onward, reaches 35 knots. The armament of this class is four 4-in., and two 14-pr. A.A., with four triple 21-in. T.T. They are:

Sampson, Rowan, Davis, Allen, Wilkes, Shaw, Caldwell, Craven, Gwin, Conner, Stockton, Manley, Wickes, Philip, Evans, Little, Kimberley, Sigourney, Gregory, Stringham, Dyer, Colhoun, Stevens, McKee, Robinson, Ringgold, McKean, Harding,† Gridley, Fairfax, Taylor, Bell, Stribling,* Murray,* Israel,* Luce,* Maury,* Lansdale,* Mahan,* Schley, Champlin, Mugford,† Chew, Hazelwood, Williams, Crane, Hart,* Ingraham,* Ludlow,* Rathburne, Talbot, Waters, Dent, Dorsey, Lea, Lamberton, Radford, Montgomery, Breese, Gamble, Ramsay, Tattnall, Badger, Twiggs, Babbitt, Jacob Jones,* Buchanan, Aaron Ward, Hale, Crowninshield, Boggs, Kilty, Kennison, Ward,* Claxton, Hamilton, Tarbell, Yarnall, Upshur, Greer, Elliot, Roper, Breckinridge, Barney, Blakeley, Biddle, Du Pont, Bernadou, Ellis, Cole, J. Fred Talbot, Dickerson, Leary, Schenck, Herbert, Palmer, Thatcher, Walker, Crosby, Meredith, Bush, Cowell, Maddox, Foote, Kalk, Burns,* Anthony,* Sproston,* Rizal,* Mackenzie, Renshaw, O'Bannon, Hogan, Howard, Stansbury, Hopewell, Thomas, Haraden, Abbot, Bagley, Clemson.

The final class (1919–22) is of the same type, and comprises 155 vessels. The displacement is 1,215 tons and the H.P. 27,000. All these vessels have oil fuel and geared turbines, many of them electric drive, and the designed speed is 35 knots. The armament is the same as in the preceding list, except that there is but one 14-pr. A.A. There are a few exceptions, the Long having eight 4-in., the Kane, Fox, Gilmer, Brooks, and Hatfield four 5-in., and the Tillman two 13-pr. A.A. Seven vessels of this class, Delphy, S. P. Lee, Chauncey, Fuller, Woodbury, Nicholas, and Young, were involved in the disaster of September 9, 1923, when, steaming at 20 knots in fog and heavy tide, they ran on the rocks near Santa Barbara. The list of the class is as follows:

Dahlgren, Golsborough, Semmes, Satterlee, Mason, Abel P. Upshur, Hunt, Welborn C. Wood, George E. Badger, Branch, Herndon, Dallas, Chandler, Southard, Hovey, Long, Broome, Alden, Smith Thompson, Barker, Tracy, Borie, John D. Edwards, Whipple, Parrott, Stewart, Hatfield, Brooks, Gilmer, Fox, Kane, Humphreys, McFarland, James K. Paulding, Overton, Sturtevant, Childs, Sands, Reuben James, Belknap, McCook, Rodgers, Ingram-Osmond, Bancroft, Welles, Aulick, Turner, Gillis, Delphy, McDermut, Laub, McLanahan, Edwards, Greene, Ballard, Shubrick, Bailey, Thornton, Morris, Tingey, Swasey, Meade, Sinclair, McCawley, Moody, Henshaw, Meyer, Doyen, Sharkey, Toucey, Breck, Isherwood, Case, Lardner, Putnam, Worden, Flusser, Dale, Reid, Chauncey, Fuller, Percival, John Francis Burnes, Farragut, Somers, Stoddert, Reno, Farquhar, Thompson, Kennedy, Paul Hamilton, William Jones, Woodbury, S. P. Lee, Nicholas, Young, Zeilin, Yarborough, La Vallette, Sloat, Wood, Shirk, Kidder, Selfridge, Marcus, Mervine, Chase, Robert Smith, Mullany, Preston, Lamson, Litchfield, Zane, Wasmuth, Trever, Hulbert, Noa, William B. Preston, Preble, Tillman, Pillsbury, Ford, Truxton, Paul Jones, King, Williamson, Bainbridge, Goff, Barry, Hopkins, Lawrence, Coghlan, Hull, McDonogh, Fahrenholt, Sumner, Perry, Decatur, Converse, Billingsley, Osborne, Bruce, Charles Ausburne, Edsall, MacLeish, Simpson, Bulmer, McCormick, Corry, Melvin, Pope, Peary, Sicard, Pruitt.

SUBMARINES.

The earlier submarines are being eliminated from the Fleet. The D, F, and G classes have been removed, and the H, K, L, and N classes are for coast defence only. Some of the N class and the single boat of the M class are for sale. The S class is the latest, and of the 50 boats, about 6 have yet to be completed. The first of the class displaces 854–1,062 tons, with 1,200 H.P., but the later boats are 1,200–1,800 H.P. Up to No. 47 the armament is one 4-in. and four 21-in. tubes, but in the later boats the tubes are increased to 5. Twelve torpedoes are carried. The Fleet submarines are T 1, 2, 3 (1916–20), are of 1,106–1,487 tons and 4,400–1,520 H.P., and have one 4-in. and six 21-in. tubes, and carry 16 torpedoes. Their surface speed is estimated at 21 knots. V 1, 2, 3, just completing, are larger; 2,164–2,520 tons and estimated H.P. of 6,500, and they have one 5-in. and one 3-in. A.A., with six 21-in. T.T.

The flotillas are as follows:—

H 2 to 3.	1913.	358–434 tons, 14–10½ knots	2
H 4 to 9.	1918.	357–454 tons, 12–10½ knots	6
K 1 to 8.	1914.	392 500 tons, 14–9½ knots.	8
L 2, 3, 5–9, 11.	1916–17.	450 548 tons, 14–10½ knots, 4 T.T.'s	8
N 1 to 3.	1918–19.	357–414 tons, 4 T.T. (4 torpedoes)	3
The following are the first line boats:—			
O 1 to 16.	1918.	520–629 tons, 4 T.T., (8 torpedoes), 1 3-in., 14–11 knots	16
R 1 to 27.	1918–19.	569–680 tons, 13¼–10½ knots, 4 T.T., (8 torpedoes), 1 3-in (coastal)	27
S 1 to 4, 6 to 51.		Approximately 900–1100 tons, 4-in. guns, 12 21-in. torpedoes carried, with 4 and 5 T.T.'s	50
Fleet submarines:—			
T 1, 2, 3.	1916–20.	1,106–1,487 tons, 1 4-in., 6 21-in. tubes, 4,400–1,520 H.P., 20–11 knots	3
V 1, 2, 3.	1920–25.	2,164–2,520 tons, 1 5-in., 1 3-in. A.A., 6 21-in. tubes, 6,500 H.P., 21–9 knots	3
*V 4.	Bldg.	Understood to be an advance on the three previous boats	1
In addition, five other V class are authorised, and one vessel named Neff			5

* Fitted as mine-layers. † Fitted as seaplane tenders.

PLANS

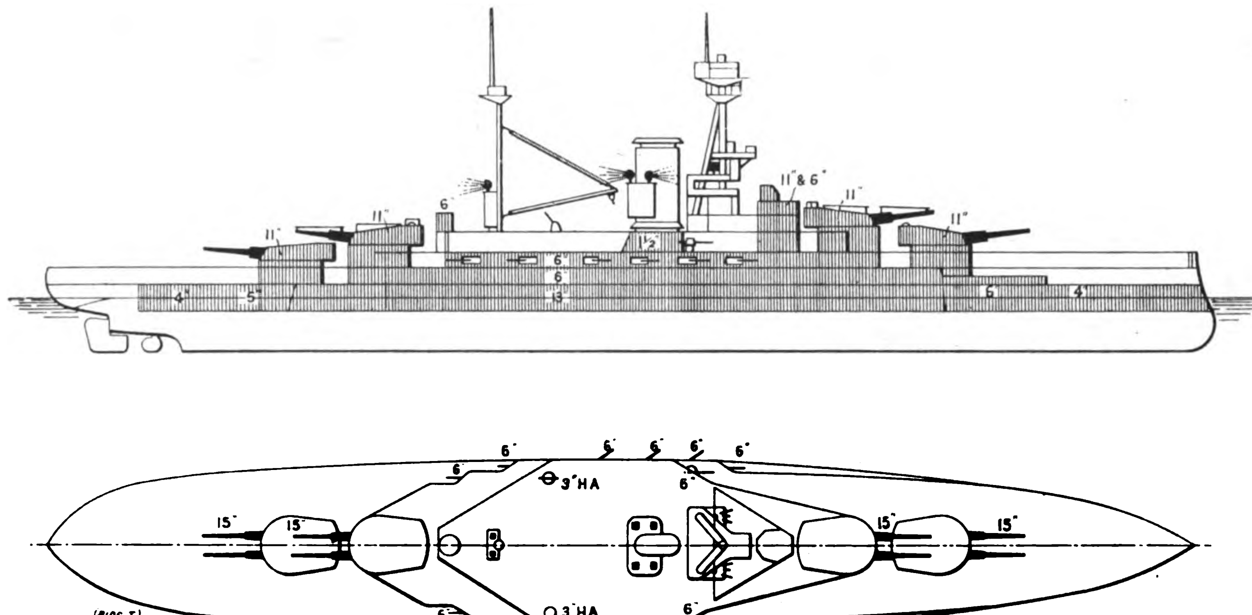
OF

BRITISH AND FOREIGN WARSHIPS.

GREAT BRITAIN.

BATTLESHIPS.

Royal Sovereign. Royal Oak. Revenge. Resolution. Ramillies.



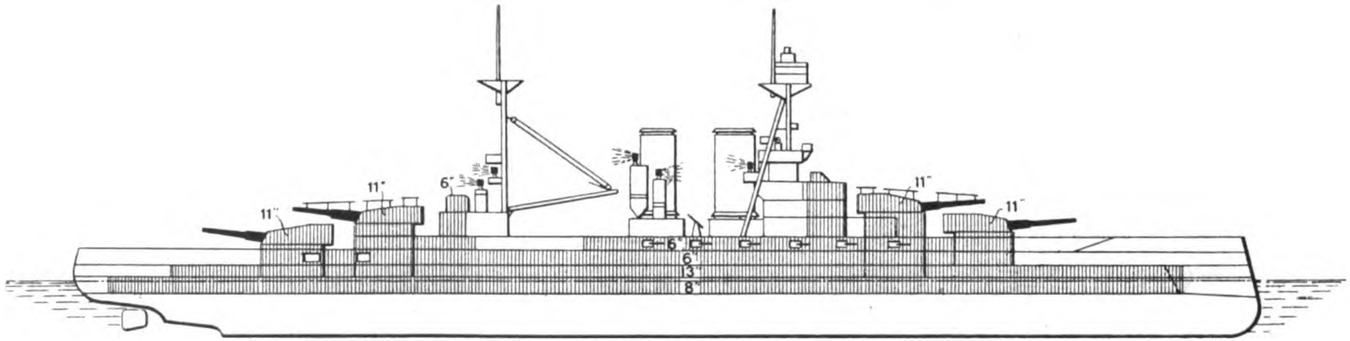
Length (extreme), 620 ft. 6 ins.* ; Length B.P., 580 ft. ; 25,750 tons ; Speed, 23 knots ; Completed, 1916–17.
Armament, 8—15 in. ; 14—6 in. ; 2—4-in. A.A. ; 4—3-pr. ; 5 M ; 10 L.
Searchlights on mainmast removed.

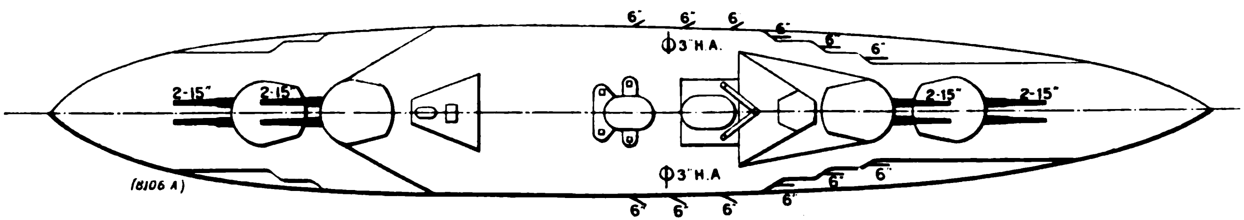
* Revenge, 624 ft. 6 in.

GREAT BRITAIN.

BATTLESHIPS.

Queen Elizabeth. **Warspite.** **Barham.** **Valiant.** **Malaya**





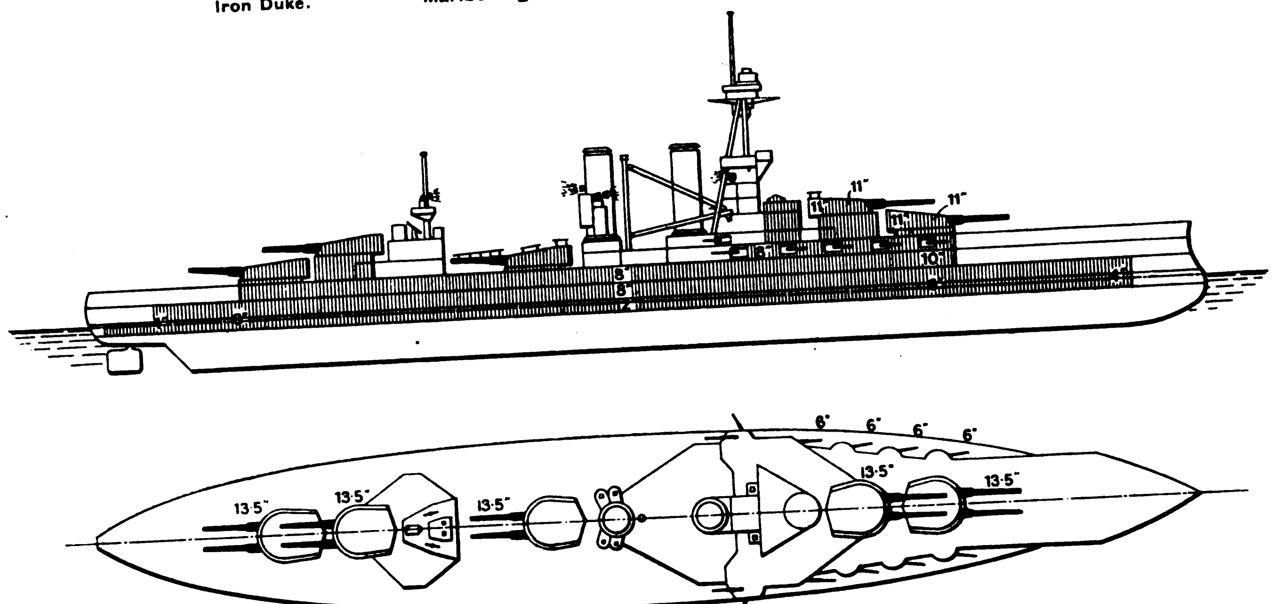
Length (extreme), 639 ft. 9 ins.* ; Length B.P., 600 ft. ; 27,500 tons ; Speed, 25 knots ; Completed, 1915-1916.
Armament, 8—15-in. ; 12—6-in. ; 2—3-in. A.A. ; 4—3-pr. ; 5 M. ; 10 L.
Searchlights abaft mainmast removed.

* Barham and Warspite, 643 ft. 9 ins. Malaya has 4—4-in. A.A.

GREAT BRITAIN.

BATTLESHIPS.

Iron Duke. Marlborough. Benbow. Emperor of India.



(8106 B)

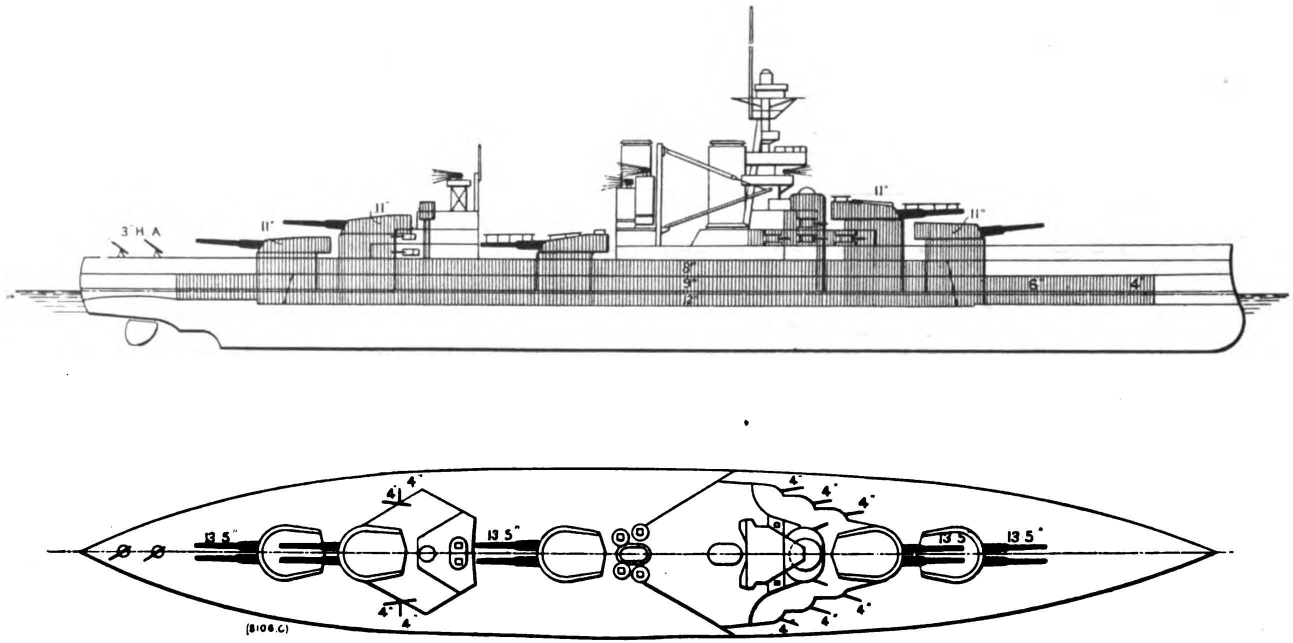
Length (extreme), 623 ft. 9 ins.*; Length B.P., 580 ft.; 25,000 tons; Speed, 21 knots; Completed, 1914.
Armament, 10—13·5-in.; 12—6-in.; 2—3-in. H.A.; 4—3-pr.; 5 M; 10 L.

* Marlborough, 623 ft.; Emperor of India, 622 ft. 9 ins.

GREAT BRITAIN.

BATTLESHIPS.

King George V. Ajax. Centurion.



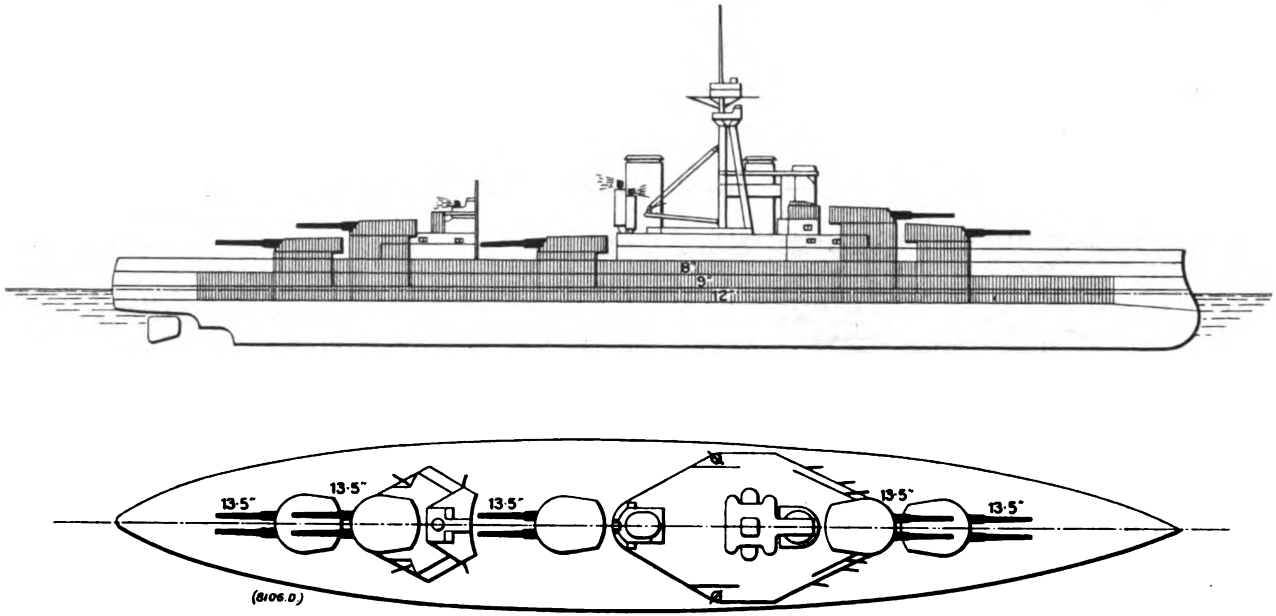
Length (extreme), 597 ft. 9 ins.*; Length B.P., 555 ft.; 23,000 tons; Speed, 21 knots; Completed, 1912-13.
Armament, 10—13·5-in.; 12—4-in.; 4—3-pr.; 2—3-in. A.A.; 5 M.; 10 L.
These vessels are due to be scrapped on the completion of the Nelson and Rodney.

* King George V., 594 ft. 4 ins.

GREAT BRITAIN.

BATTLESHIP.

Thunderer (Cadets Training Ship).

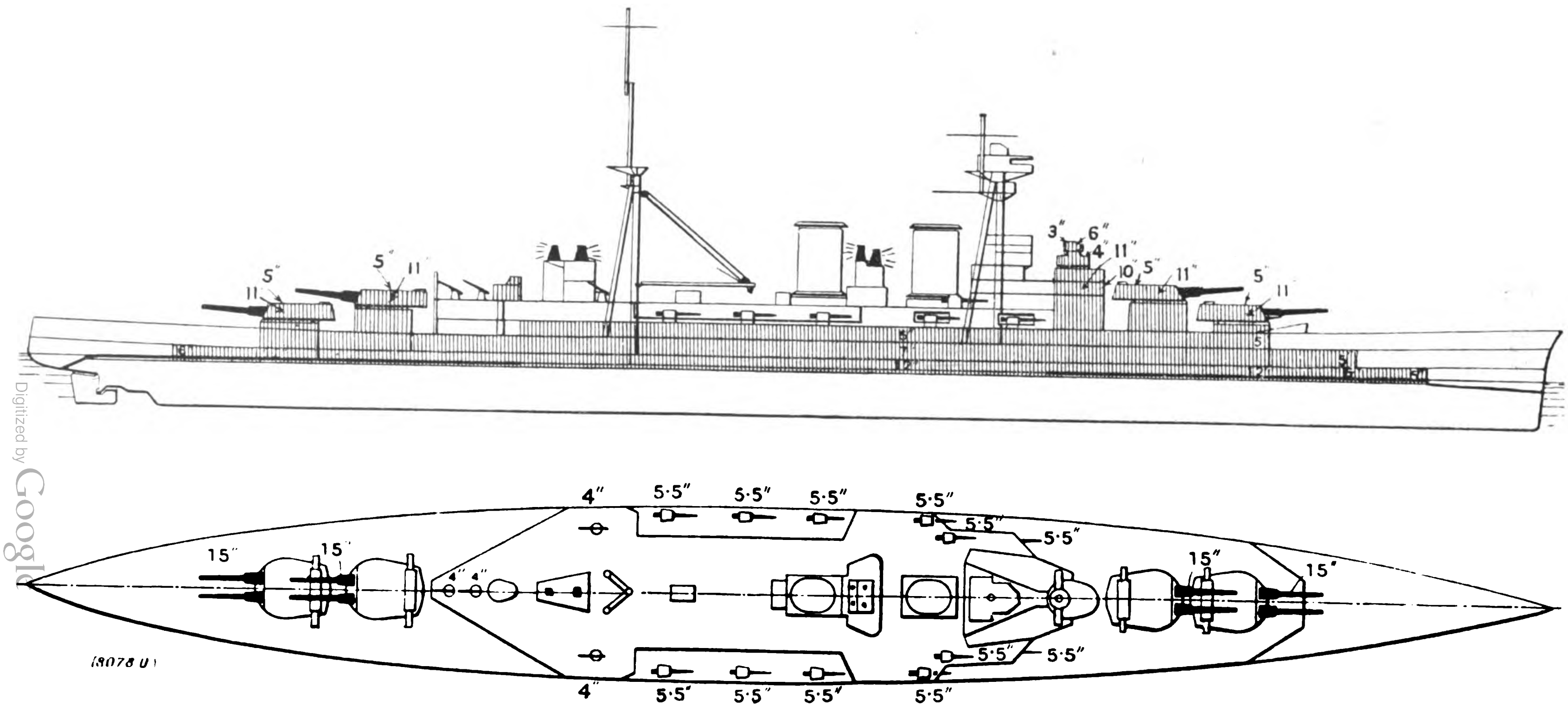


Length (extreme), 581 ft. 2 ins. ; Length B.P., 545 ft. ; 22,500 tons ; Speed, 21 knots ; Completed, 1912. Armament, 10—13·5-in. ; 8—4-in. ; 1– 3-in. A.A. ; 4 3-pr. ; 5 M. ; 10 L.

GREAT BRITAIN.

BATTLE-CRUISER.

Hood.



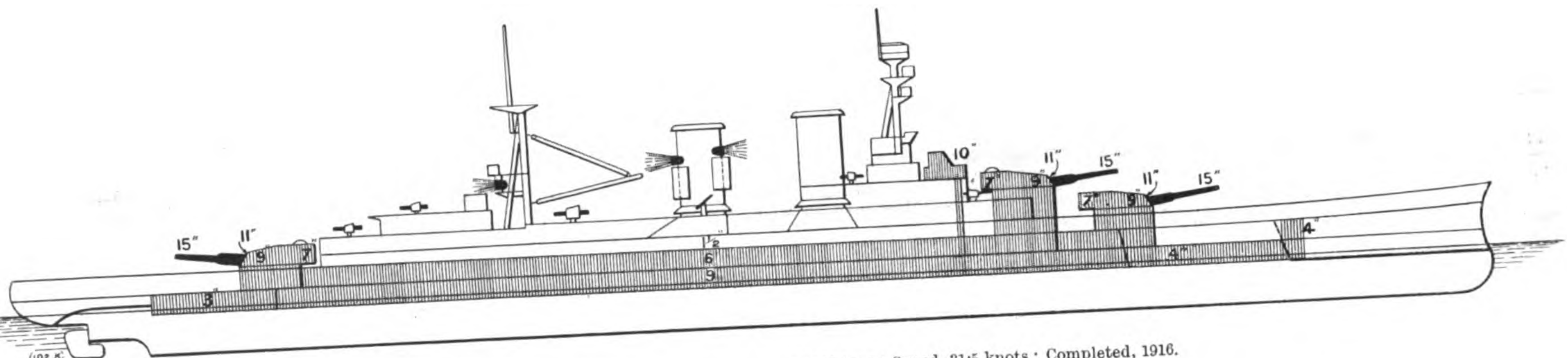
Length (extreme), 860 ft. 7 ins. ; Length B.P., 810 ft. ; 41,200 tons; Speed, 31* knots ; Completed, 1920.
Armament, 8—15-in. ; 12—5·5-in. ; 4—4-in. A.A. ; 4—3-pdr.

* Trials at 44,600 tons, 31·89 knots with 151,000 S.H.P.

GREAT BRITAIN.

BATTLE-CRUISERS.

Repulse. **Renown.**



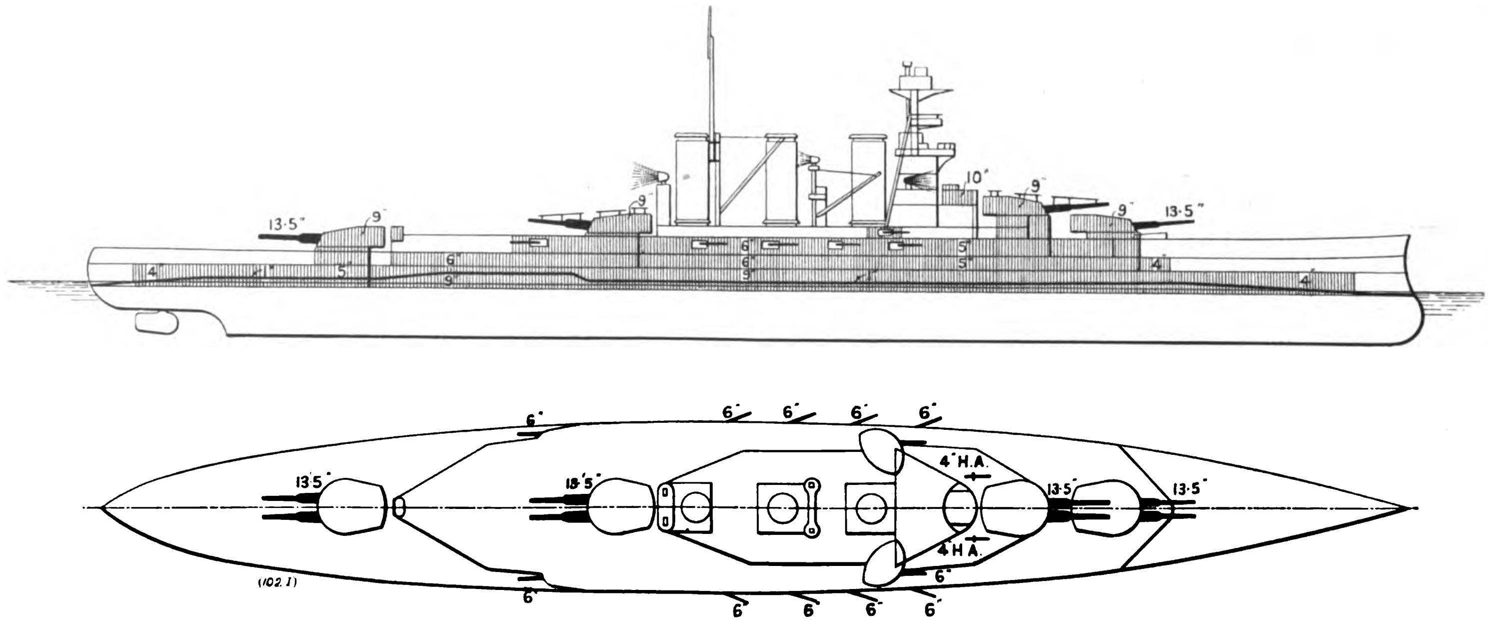
Length (extreme), 794 ft. 2 ins. ; Length, B.P., 750 ft. ; 26,500 tons ; Speed, 31·5 knots ; Completed, 1916.
Armament, 6—15-in. ; 15—4-in. ; 4—3-pr. ; 4—4-in. A.A. ; 5 M. ; 10 L.

NOTE.—Repulse originally had a 6-in. main belt, but was re-armoured in 1920–21. Re-armouring of the Renown is allowed for by Chapter II., Part 3, Section (*d*) 2. of the Treaty of Washington.

GREAT BRITAIN.

BATTLE-CRUISER.

Tiger.

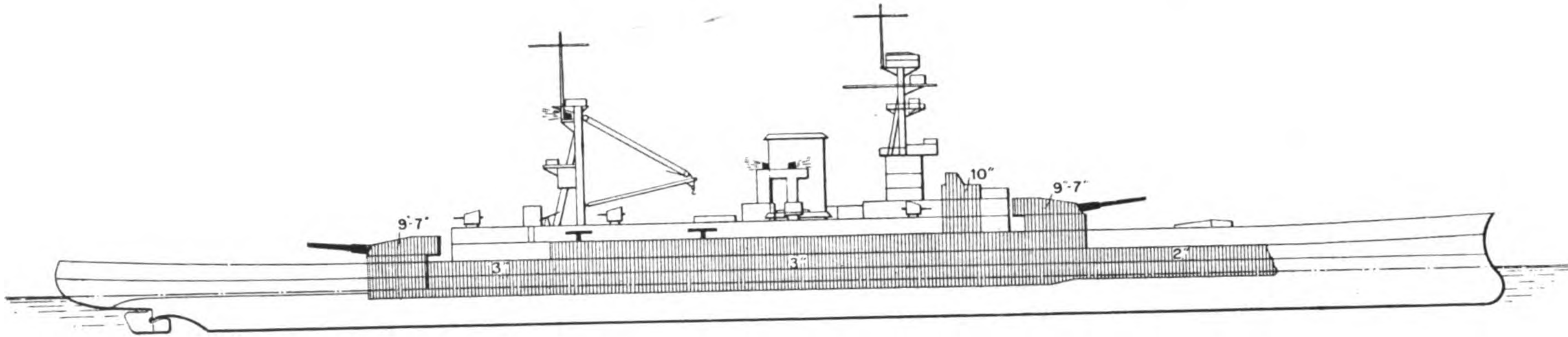


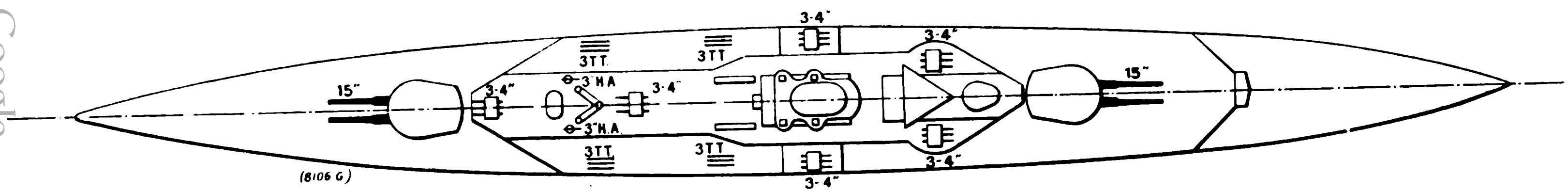
Length (extreme), 704 ft.; Length B.P., 660 ft.; 28,500 tons; Speed, 30 knots; Completed, 1914.
Armament, 8—13·5-in.; 12—6-in.; 4—3-pr.; 4—4-in. A.A.; 5 M.; 10 L.

GREAT BRITAIN.

LARGE LIGHT CRUISERS.

Courageous. **Glorious.**





(8106 G)

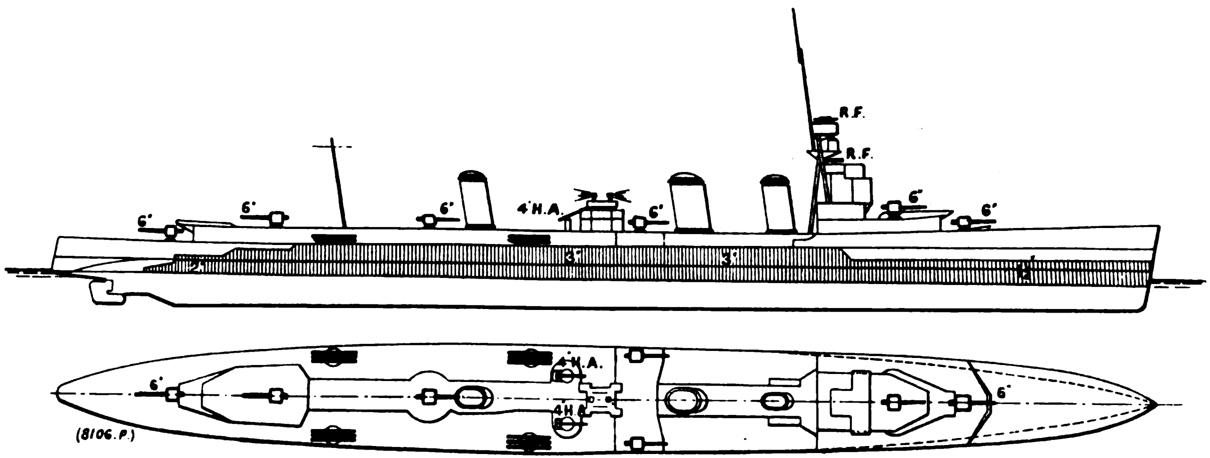
Length (extreme), 786 ft. 3 ins.; Length B.P., 735 ft.; 18,600 tons; Speed, 31 knots; Completed, 1917.
Armament, 4—15-in.; 18—4-in.; 2—3-in. A.A.; 4—3-pr.; 5 M.; 10 L.

NOTE.—These vessels are being reconstructed as Aircraft Carriers.

GREAT BRITAIN.

LIGHT CRUISERS.

Emerald. **Enterprise.**

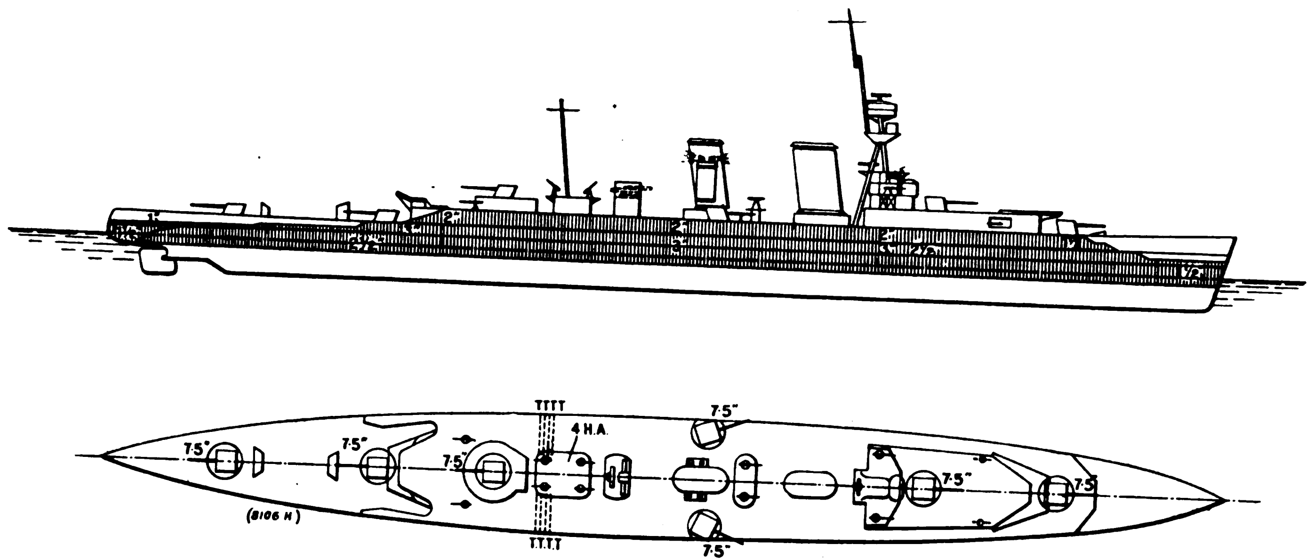


Length (extreme), 570 ft. ; Length B.P., 535 ft. ; 7,550 tons ; Speed, 33 knots.
Armament, 7—6-in. ; 3—4-in. A.A. ; 4—3-pr. ; 2—2-pr. Pom Pom. ; 1 M.

GREAT BRITAIN.

LIGHT CRUISERS.

Effingham. Hawkins. Frobisher. Vindictive.*



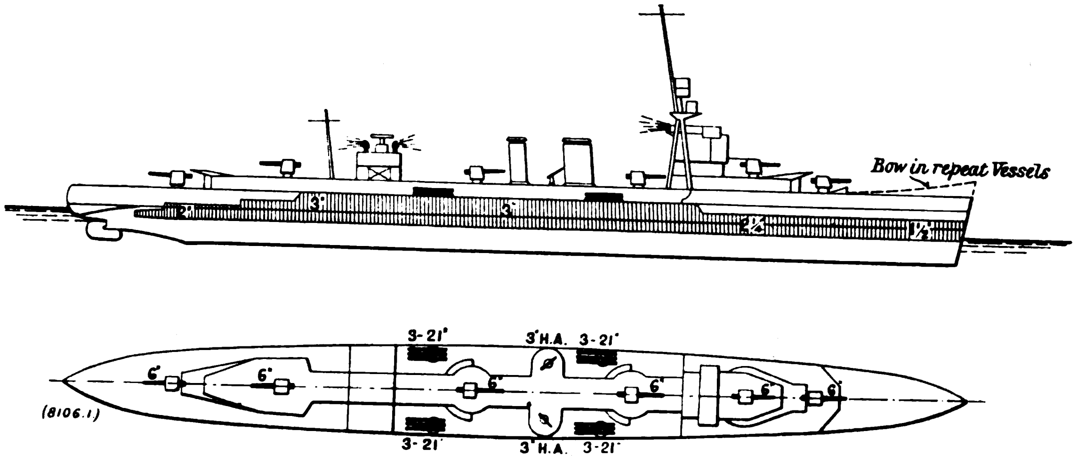
Length (extreme), 605 ft.; Length B.P., 565 ft.; 9,750 tons; Speed, 30 knots.
Armament, 7—7·5-in.; 3—4-in. A.A.; 4—3-pr.; 2 M.; 8 L.

* Vindictive has a flying-off platform forward of the bridge, and for this the raised 7·5 in. gun forward has been removed.

GREAT BRITAIN.

LIGHT CRUISERS. D CLASS.

Despatch.* **Diomede.*** **Danae.** **Dauntless.** **Dragon.** **Delhi.*** **Dunedin.*** **Durban.***



Length, 445 ft. ; 4,750 tons †; Speed, 29 knots ;
Armament, 6—6 in. ; 3—4-in. A.A. ‡ ; 2 M.

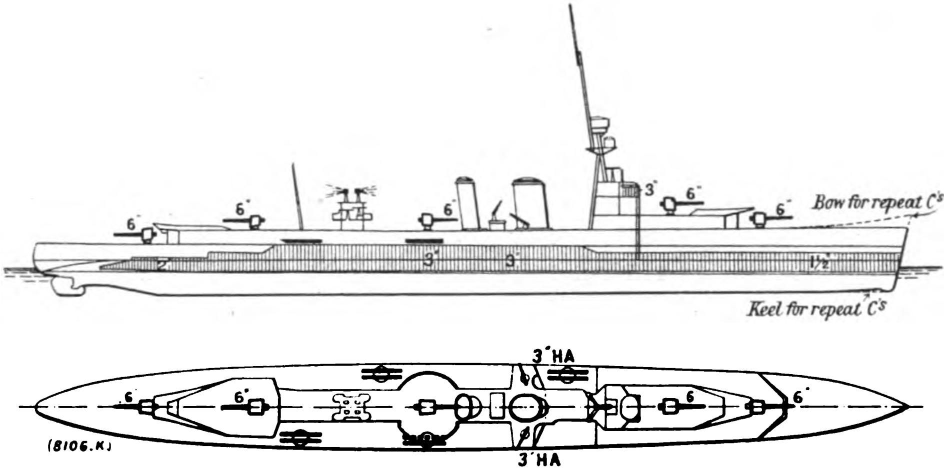
* Repeat vessels.
† Despatch and Durban are 4,765 tons.
‡ Despatch, Diomede, and Durban have 2—4-in. A.A. guns.

Dunedin is now attached to the New Zealand Division.

GREAT BRITAIN.

LIGHT CRUISERS.

Ceres. ***Cairo.** **Curacoa.** **Cape Town.** **Curlew.** **Carlisle.** **Cardiff.** **Colombo.** **Coventry.** **Calcutta.**

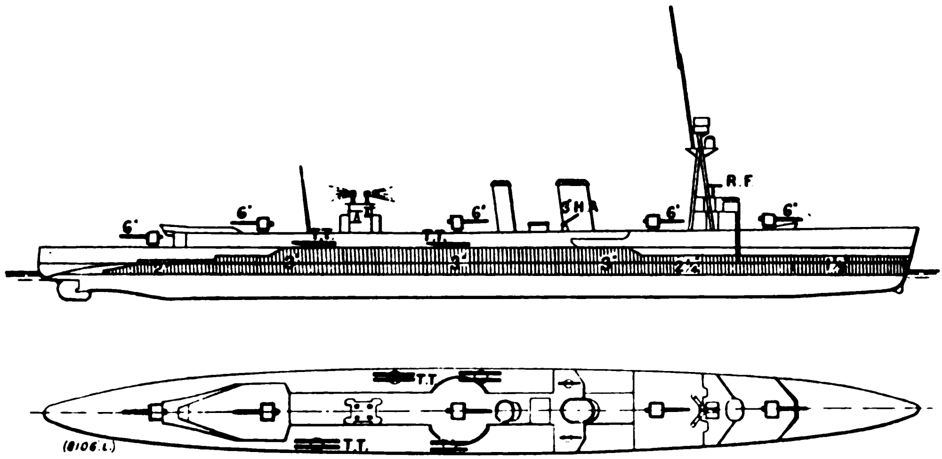


Length (extreme), 450 ft. (451 ft. 6 ins. Repeat Vessels); Length B.P., 425 ft.; 4,190 tons; Speed, 29 knots; Completed, 1917-18 (Repeat Vessels, 1918-22).
Armament, 5—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 4 above-water D.R. torpedo tubes.

*** Repeat vessels.**

LIGHT CRUISERS.

Caledon. ***Centaur.** **Calypso.** **Concord.** **Caradoc.**



*** These Plans apply to the above-named ships, but there are differences in detail, as stated.**

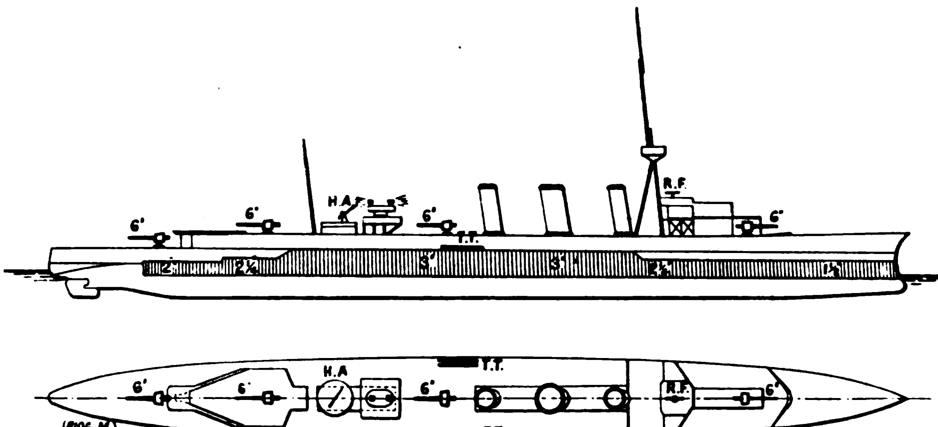
Caledon, Calypso, Caradoc — Length (extreme), 450 ft.; Length B.P., 425 ft.; 4120 tons; Speed, 29 knots; Completed, 1917. Armament, 5—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 2 M.; 8 L.; and 4 above-water D.R. torpedo tubes.

Centaur, Concord — Length (extreme), 446 ft.; Length B.P., 420 ft.; 3,750 tons; Speed, 29 knots; Completed, 1916. Armament, 5—6-in.; 2—3-in. H.A.; 2—3-pr.; 2—2-pr. Pom Poms; 2 M.; 4 L.; and 2 submerged torpedo tubes.

GREAT BRITAIN

LIGHT CRUISERS.

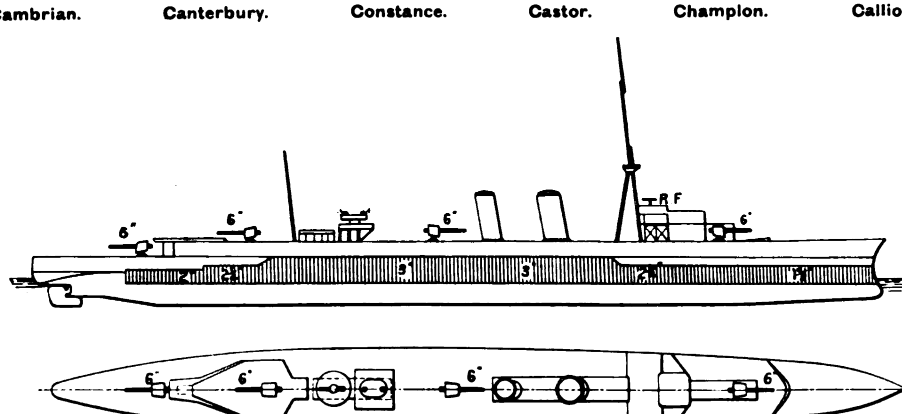
Conquest. Carysfort. Cleopatra. Comus.



Conquest, Carysfort, Cleopatra, Comus — Length (extreme), 446 ft.; Length B.P., 420 ft.; 3,750 tons; Speed, 29 knots; Completed, 1915.
Armament, 4—6-in; 2—3-in A.A.; 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 above water D.R. torpedo tubes.
(Comus and Carysfort have 4—3-pr.)

LIGHT CRUISERS.

Cambrian. Canterbury. Constance. Castor. Champion. Calliope.



Length (extreme), 446 ft.; Length B.P., 420 ft.; 3,750 tons; Speed, 29 knots; Completed, 1915.

Cambrian, Canterbury, Constance, Castor — Armament, 4—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 submerged torpedo tubes.

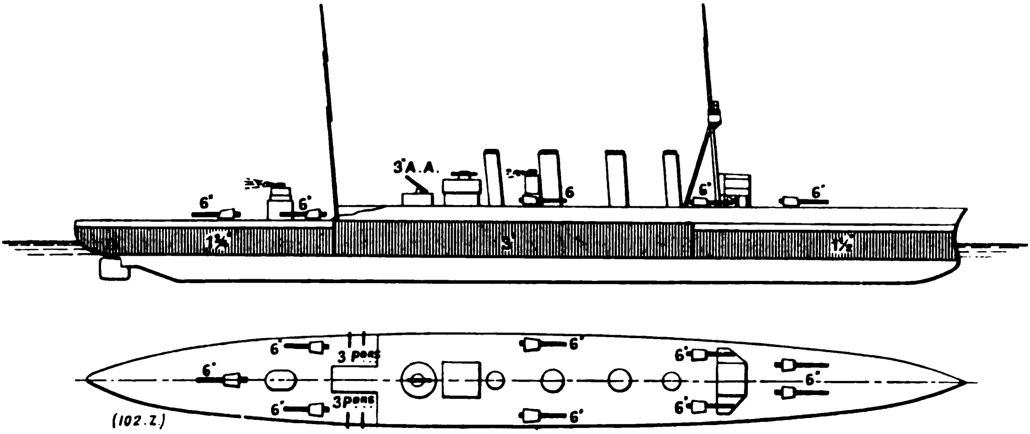
Champion — Armament, 4—6-in.; 1—4-in. A.A.; 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 submerged torpedo tubes.

Calliope — Armament, 4—6-in.; 2—3-in. A.A.; 4—3-pr. 2—2-pr. Pom Poms; 1 M.; 8 L.; 2 submerged torpedo tubes.

GREAT BRITAIN.

LIGHT CRUISERS.

Birmingham. Lowestoft. *Southampton. Dublin.



(102.Z.)

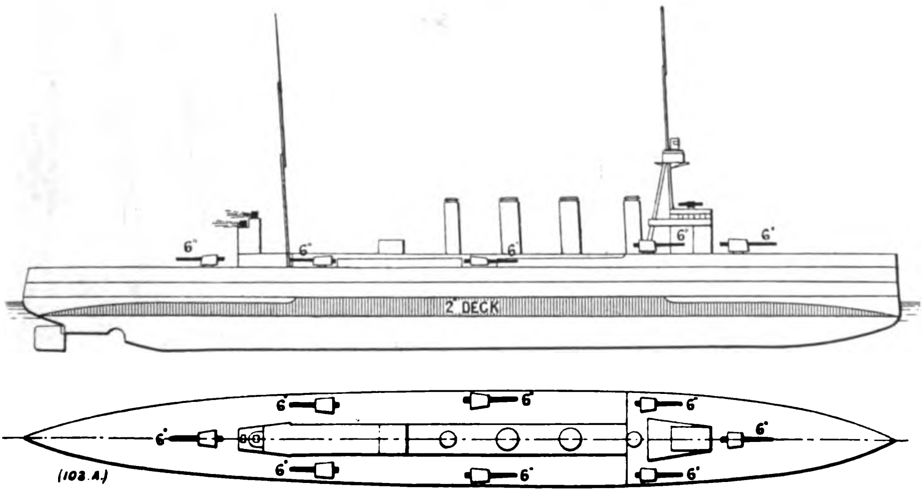
Length (extreme), 457 ft. ; Length B.P., 430 ft. ; 5,440 tons ; Speed, 25½ knots ; Completed, 1914.
5,400 tons Southampton and Dublin ; Completed, 1912-1313.

Birmingham, Lowestoft	9—6-in. ; 1—3-in. A.A. ; 4—3-pr. ; 2 M. ; 8 L. ; 2 submerged torpedo tubes.
Southampton, Dublin	8—6-in. ; 1—3-in. A.A. ; 4—3-pr. ; 2 M. ; 8 L. ; 2 submerged torpedo tubes.

* NOTE.—Southampton and Dublin have only one six-inch gun forward instead of two as for the other two vessels.

LIGHT CRUISERS.

Weymouth. Dartmouth. Yarmouth.



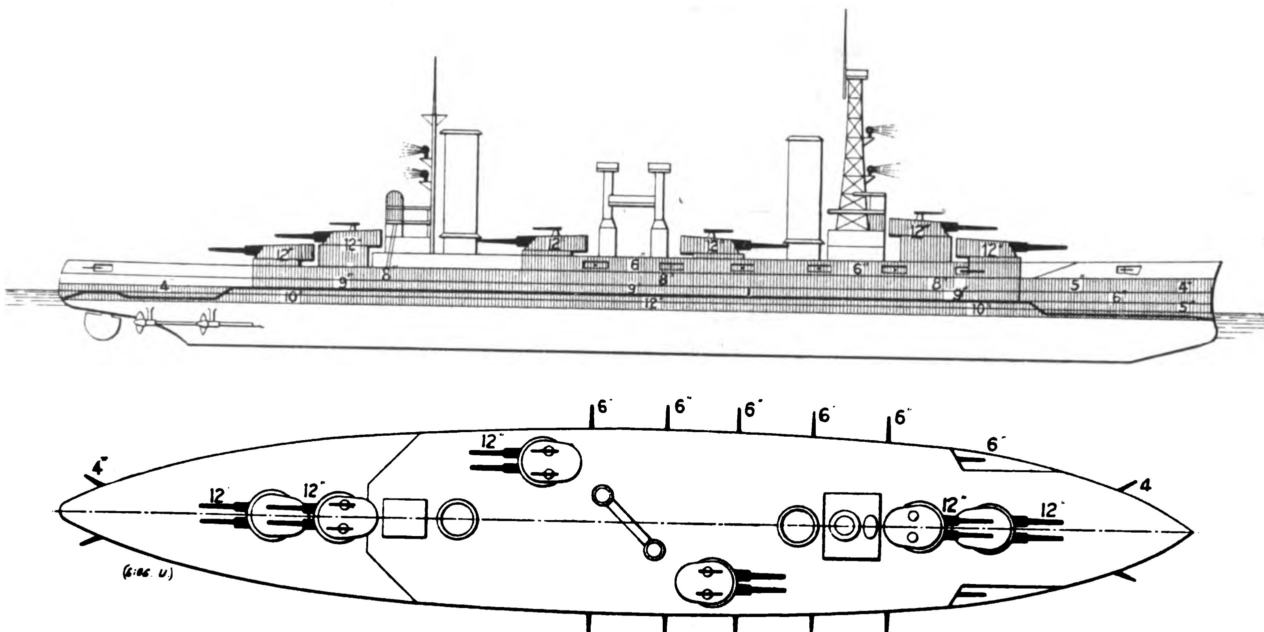
(103.A.)

Length (extreme), 453 ft. ; Length B.P., 430 ft. ; 5,250 tons ; Speed, 25½ knots ; Completed, 1911-12.
Armament, 8—6-in. ; 1—3-in A A. ; 4—3-pr. ; 2 M. ; 8 L. ; 2 submerged torpedo tubes.

ARGENTINE.

BATTLESHIPS.

Moreno. Rivadavia.

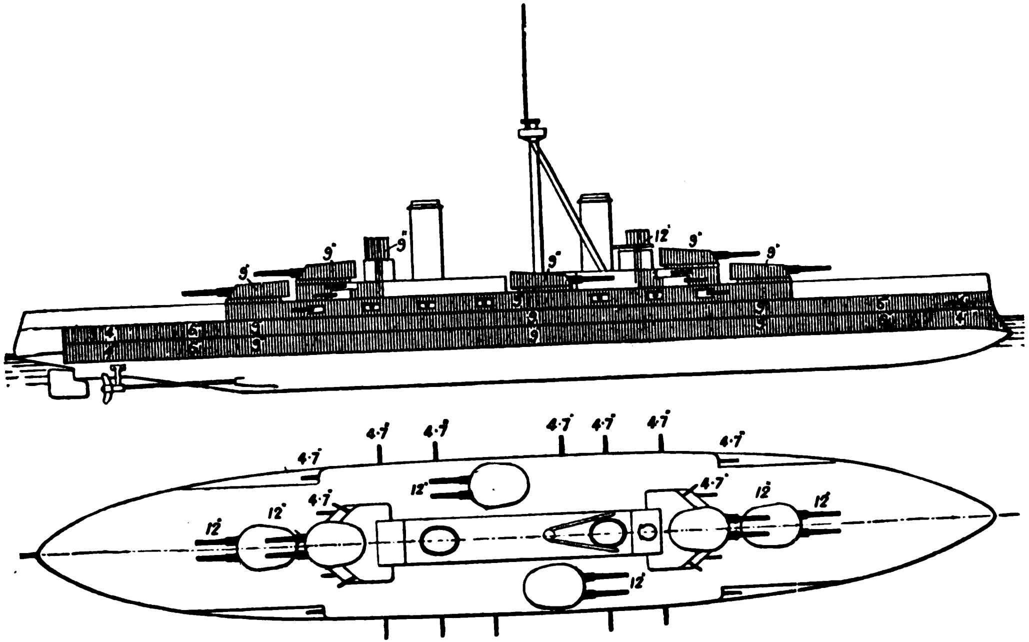


Length (extreme), 585 ft. ; Length on W.L., 575 ft. ; 27,940 tons ; Speed, 22 knots ; Completed, 1914-15.
Armament, 12—12-in. ; 12—6-in. ; 16—4-in. ; 8 smaller.

BRAZIL.

BATTLESHIPS.

Minas Geraes. **São Paulo.**

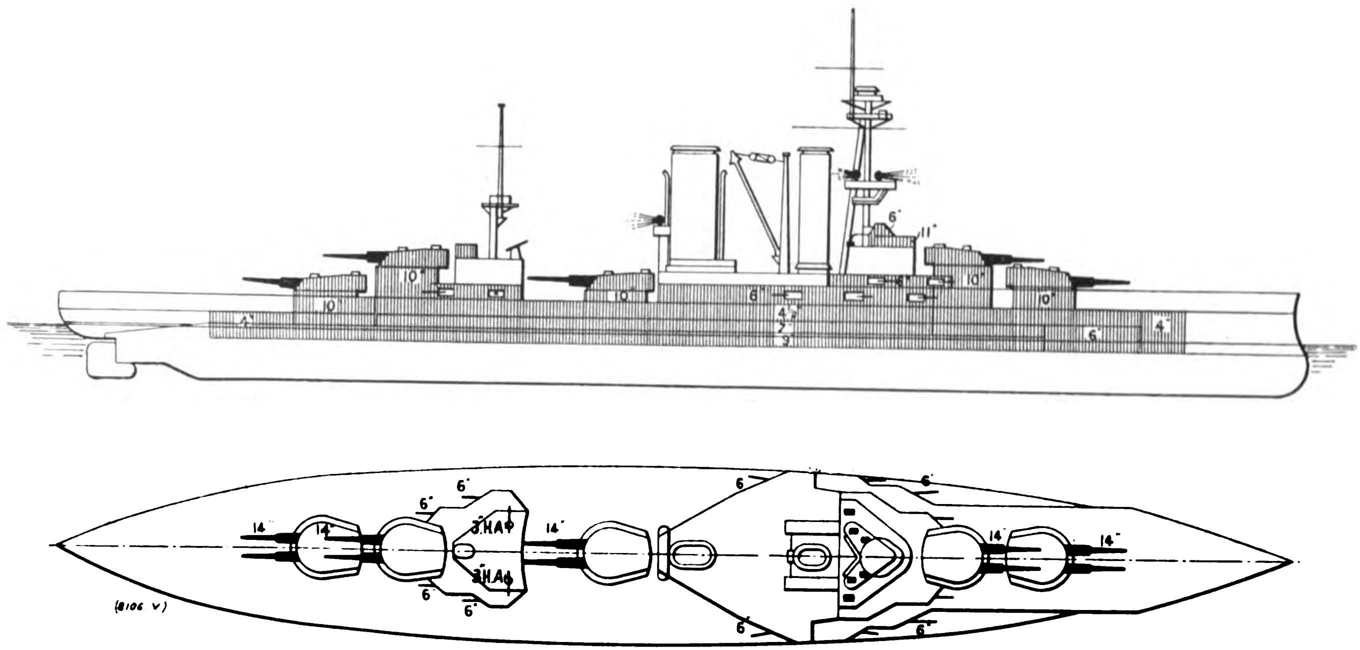


Length (extreme), 543 ft.; Length B.P., 500 ft.; 19,281 tons; Speed, 21·5 knots; Completed, 1909, 1910.
Armament, 12—12-in.; 22—4·7-in.; 8—3-pr.; 2—3-in. A.A.
Overhauled and refitted at Brooklyn Navy Yard, 1921-22, and A.A. guns installed.

CHILE.

BATTLESHIP.

Almirante Latorre (*formerly* H.M.S. Canada).

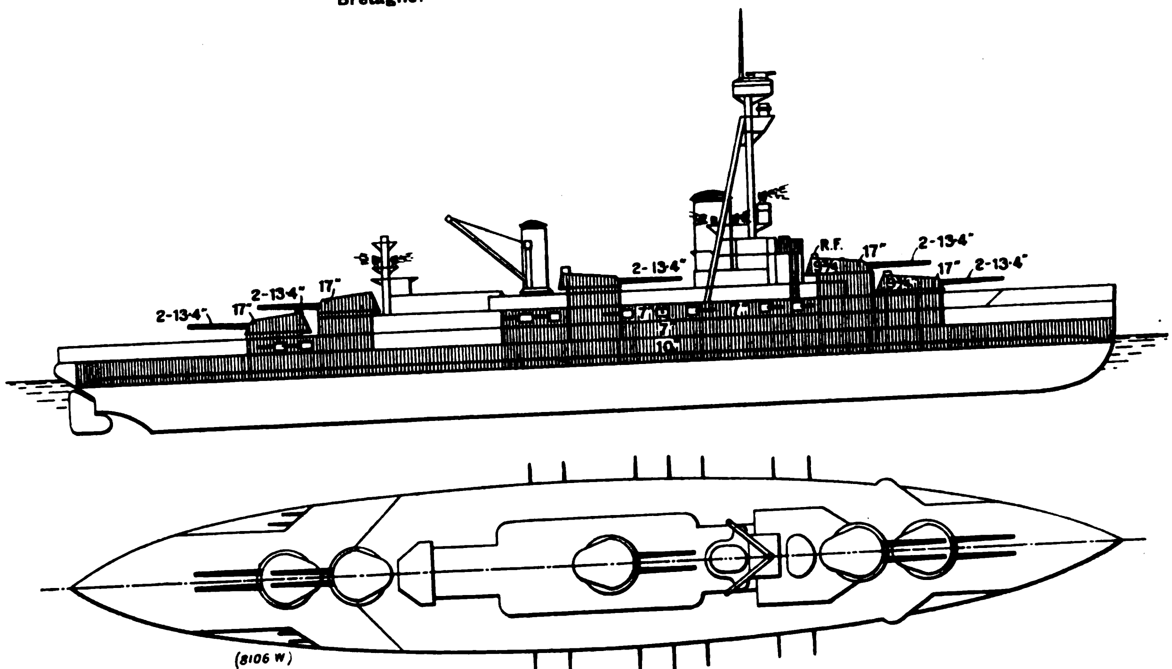


Length (extreme), 661 ft.; Length B.P., 625 ft.; 28,000 tons; Speed, 23 knots; Completed, 1915. Armament, 10—14-in.; 14—6-in.; 2—3-in.; and smaller.

FRANCE.

BATTLESHIPS.

Bretagne. Lorraine. Provence.



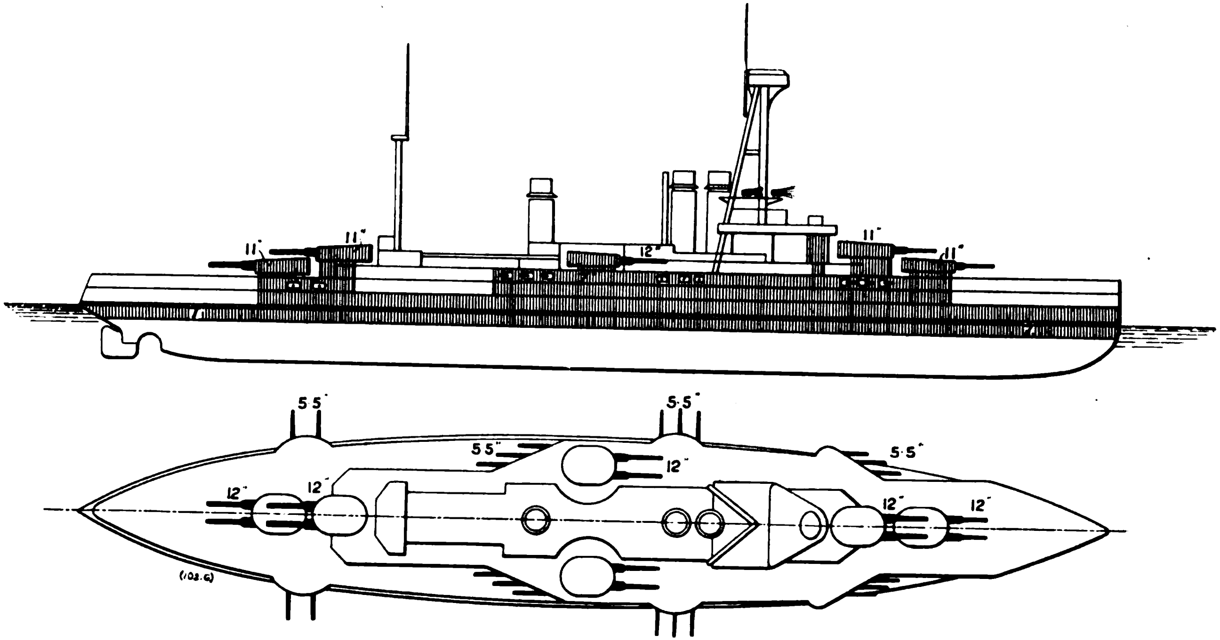
Length (extreme), 544 ft. 6 ins.; 23,177 tons; Speed, 20 knots; Completed, 1915-16; Reconstructed, 1919-20.
Armament, 10—13·4-in.; 18—5·5-in.; 4—14-pr. A.A.

NOTE.—Bretagne as above, Provence and Lorraine have a main topmast rigged.

FRANCE.

BATTLESHIPS.

Jean Bart. Courbet. Paris.



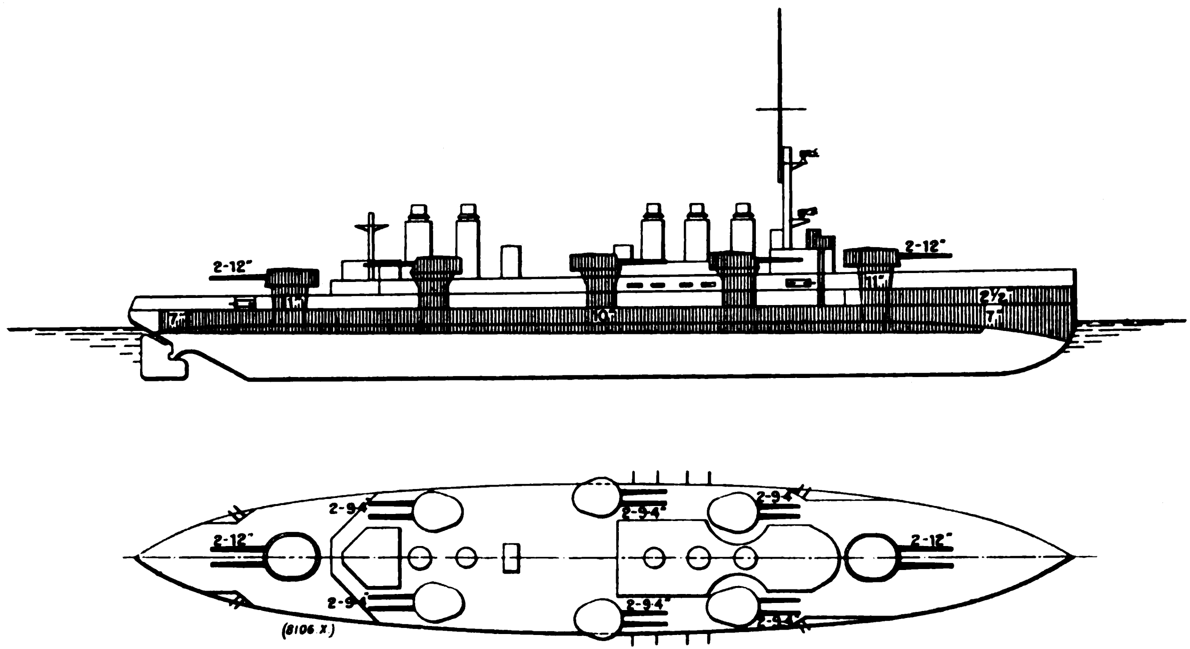
Length (extreme), 544 ft.; Length B.P., 541 ft. 4 ins.; 23,500 tons; Speed, 20 knots; Completed, 1913-14. Large alterations, 1924.
Armament, 12—12-in.; 22—5·5-in.; 4—3-pr.; 4—14-pr. A.A.

NOTE.—Courbet and Jean Bart have only one large funnel forward instead of the two smaller ones in Paris.

FRANCE.

BATTLESHIPS.

Condorcet. Diderot. Voltaire.

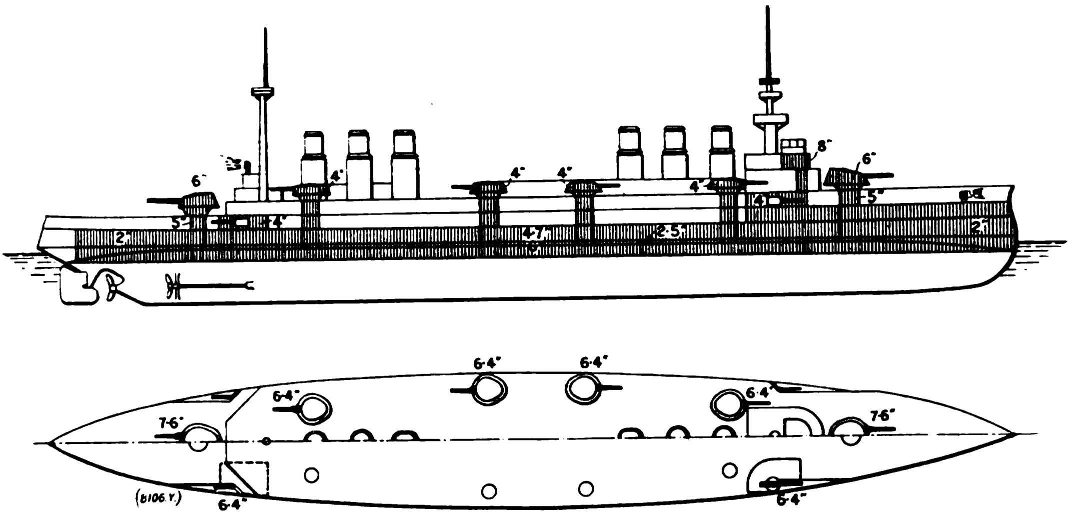


Length (extreme), 481 ft.; Length W.L., 475 ft. 9 ins.; Speed, 19¼ knots; 18,600 tons; Completed, 1911.
Armament, 4—12-in.; 12—9·4-in.; 12—3-in.; 2—3-pr.; 4—14-pr. A.A.

FRANCE.

ARMOURED CRUISERS.

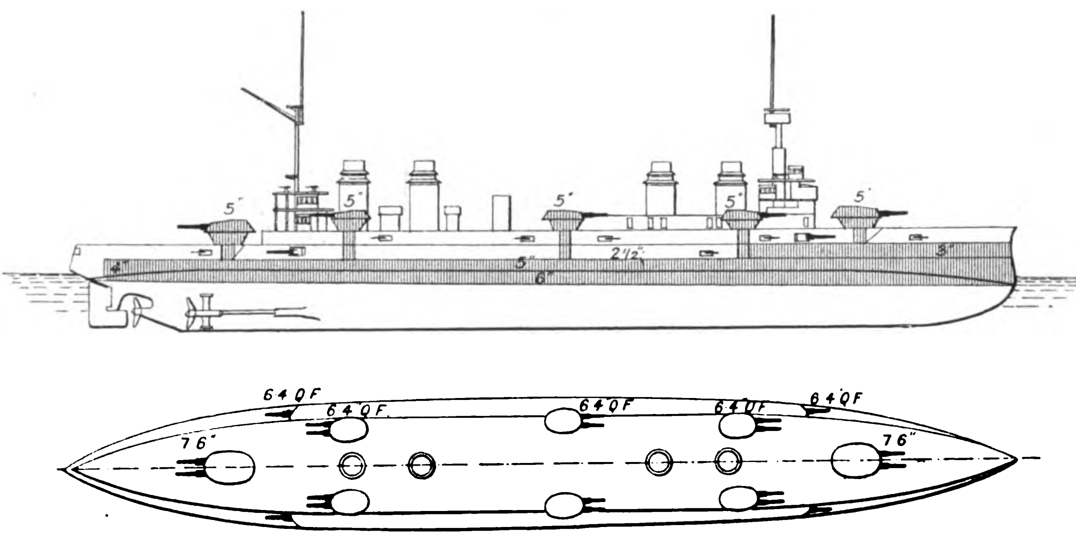
Ernest Renan. Jules Michelet.



Length, 515 ft. and 489 ft. ; 13,500 tons and 13,100 tons ; Speed, 23 knots and 22 knots ; Completed, 1909 and 1908 ; Armament, 4—7·6-in., 12—6·5-in. ; and smaller.

ARMOURED CRUISERS.

Jules Ferry. Victor Hugo.

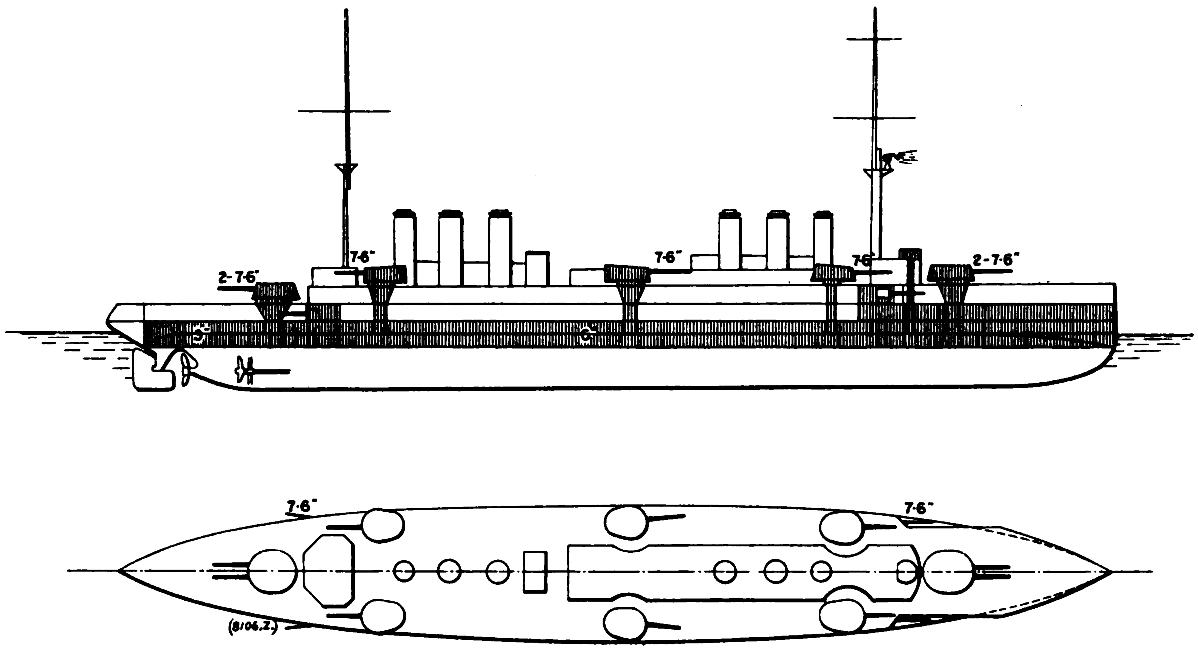


Length, 487 ft. and 480 ft. 6-ins. ; 12,351 and 13,108 tons ; Speed, 22 knots ; Completed, 1906-1907. Armament, 4—7·6-in., 16 *—6·4-in. ; 24 smaller.
* Jules Ferry has 14—6·4-in.

FRANCE.

ARMOURED CRUISERS.

Edgar Quinet. Waldeck Rousseau.

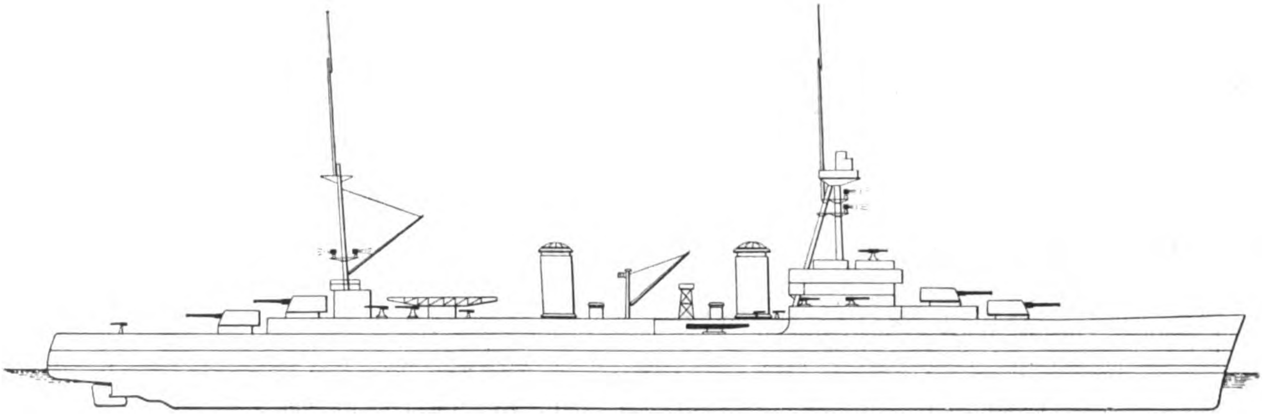


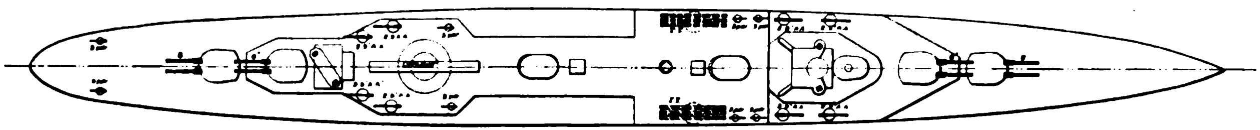
Length (extreme), 521 ft. 4 ins.; Length W.L., 515 ft.; Speed, 23 knots; 13,990 tons; Completed, 1911.
Armament, 14—7·6-in.; 10—9-pr.; and smaller.

FRANCE.

CRUISERS.

Duquesne. **Tourville.**



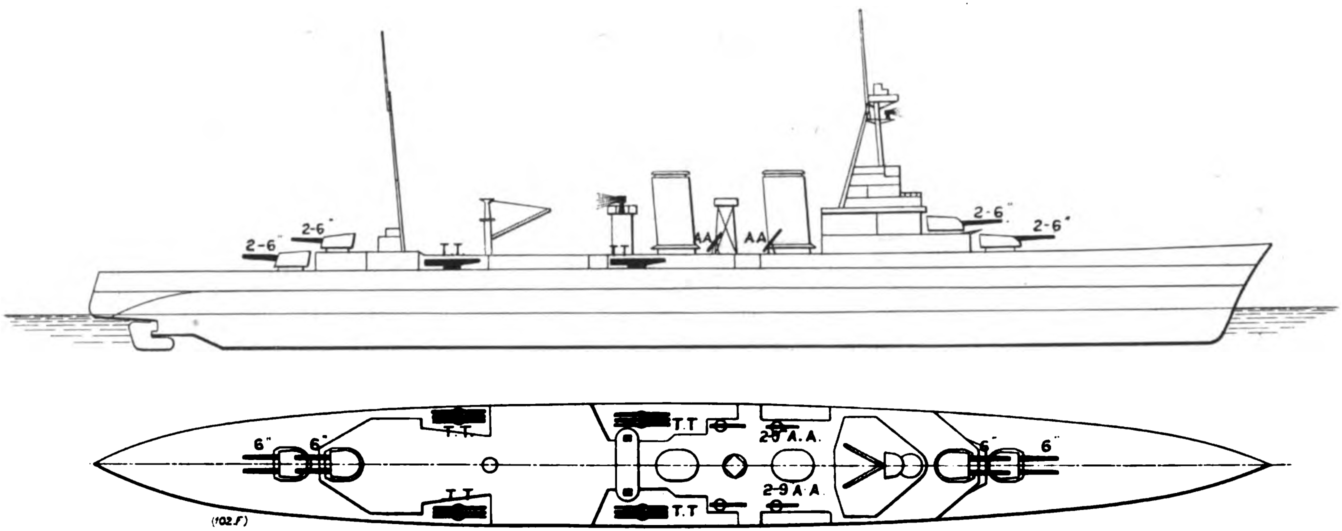


Length (extreme), 640 ft.; Length B.P., 607 ft.; 10,000 tons; Speed, 34–35 knots. Probable date of completion, early in 1927. Armament, 8—8-in., 8—2·9-in. A.A.; 8—3-pr.; 2—triple T.T.'s. Fitted with a catapult. Carries 2 seaplanes.

FRANCE.

LIGHT CRUISERS.

La Motte Piquet. Duguay-Trouin. Primauguet.



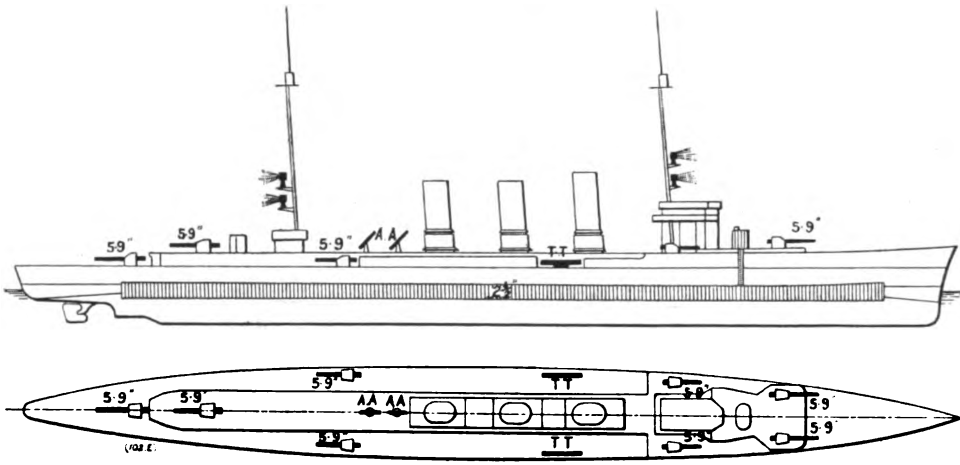
Length (extreme), 610 ft.; Length B.P., 575 ft.; 8,000 tons; Speed, 34 knots. First two ships of class laid down in August, 1922, and January, 1923. Completed 1925–1926.
Armament, 8—6-in.; 4—2·9 in. A.A.; 4 triple torpedo tubes (21·7-in. torpedoes) and 2-reconnaissance aeroplanes.

NOTE.—Reported to have protection to magazines.

FRANCE.

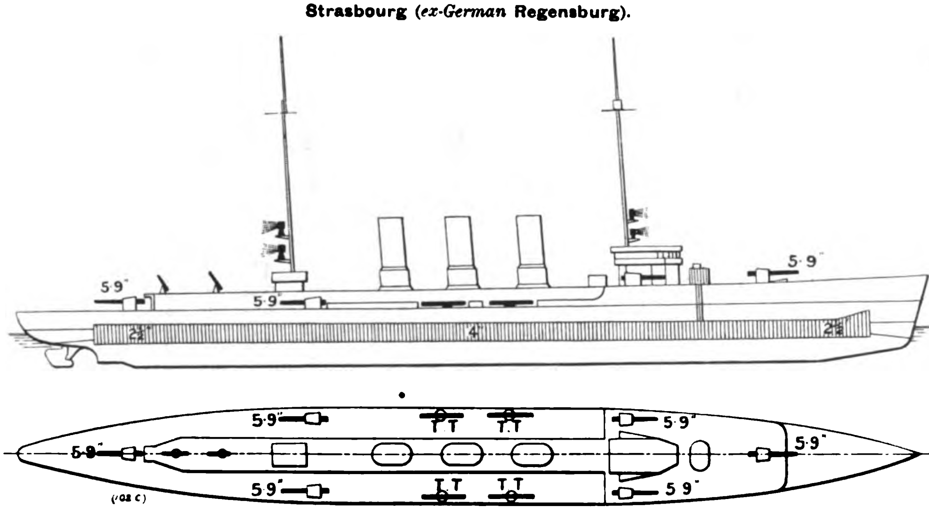
LIGHT CRUISERS.

Metz (*ex-German* Königsberg).



Length (water-line), 489 ft.; 5,300 tons; Speed, 27·5 knots; Completed, 1916.
Armament, 8—5·9-in.; 2—14-pr. A.A.; 4 M. 2 torpedo tubes.

Strasbourg (*ex-German* Regensburg).

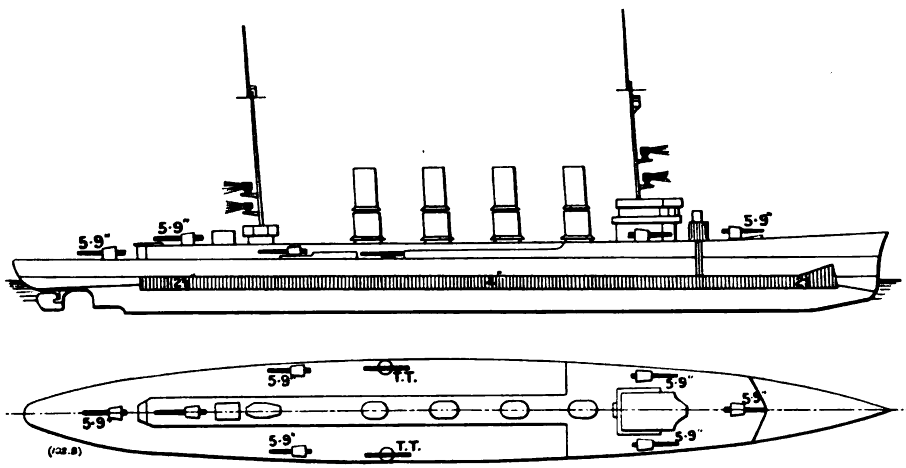


Length (extreme), 468 ft.; Length (water-line), 456 ft.; 4,900 tons; Speed, 27 knots; Completed, 1914.
Armament, 6—5·9-in.; 2—2·9-in. A.A.; 4 torpedo tubes (19·7-in. torpedoes).

FRANCE.

LIGHT CRUISER.

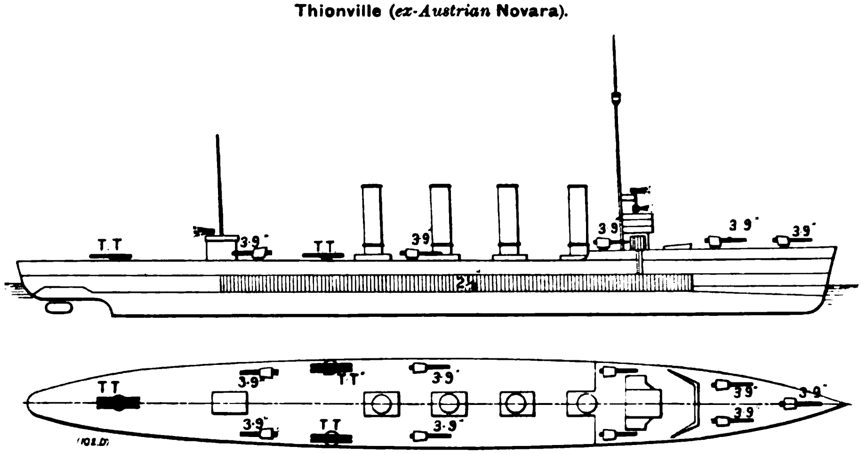
Mulhouse *ex-German* **Stralsund).**



Length (water-line), 446 ft. 3 ins. ; 4,480 tons ; Speed, 28·27 knots ; Completed, 1913.
Armament, 7—5·9-in. ; 2—2·9-in. A.A. ; 2 M. ; 2 torpedo tubes (19·7-in. torpedoes).

LIGHT CRUISER.

Thionville (*ex-Austrian* Novara).

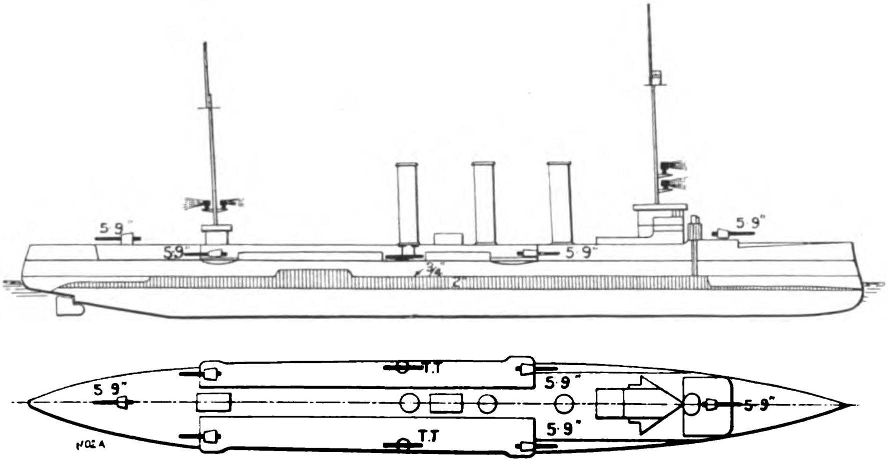


Length (extreme), 428 ft. 6 ins. ; Length (water-line), 410 ft. 9 ins. ; 3,500 tons ; Speed, 27 knots ; Completed, 1914.
Armament, 9—3·9 in. ; 1—14 pr. A.A. ; 1 triple and 2 twin above-water torpedo tubes.

FRANCE.

LIGHT CRUISER.

Colmar (*ex-German* Kolberg).

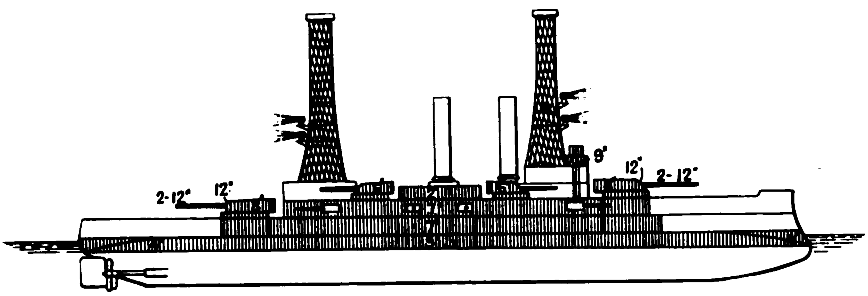


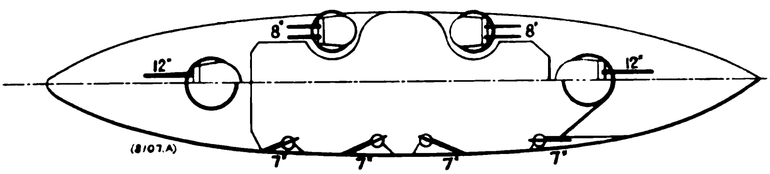
Length (water-line), 426 ft. 6 ins.; 4,280 tons; Speed, 26·3 knots; Completed, 1910.
Armament, 6—5·9-in.; 2—14-pr.; 2 above-water torpedo tubes.

GREECE.

BATTLESHIPS.

Lemnos (*ex* **Idaho**). **Kilkis** (*ex* **Mississippi**).

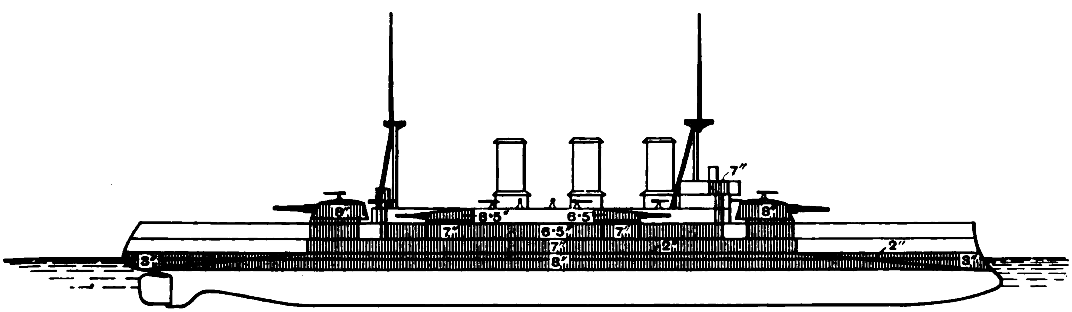


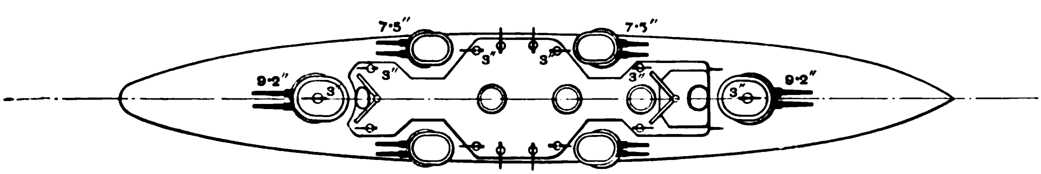


Length, 375 ft.; 13,000 tons; Speed, 17·1 knots; Completed, 1908.
Armament, 4—12-in.; 8—8-in.; 8—7-in.; 12—3-in.; 14 smaller.

ARMOURED CRUISER.

Giorgios Averoff.



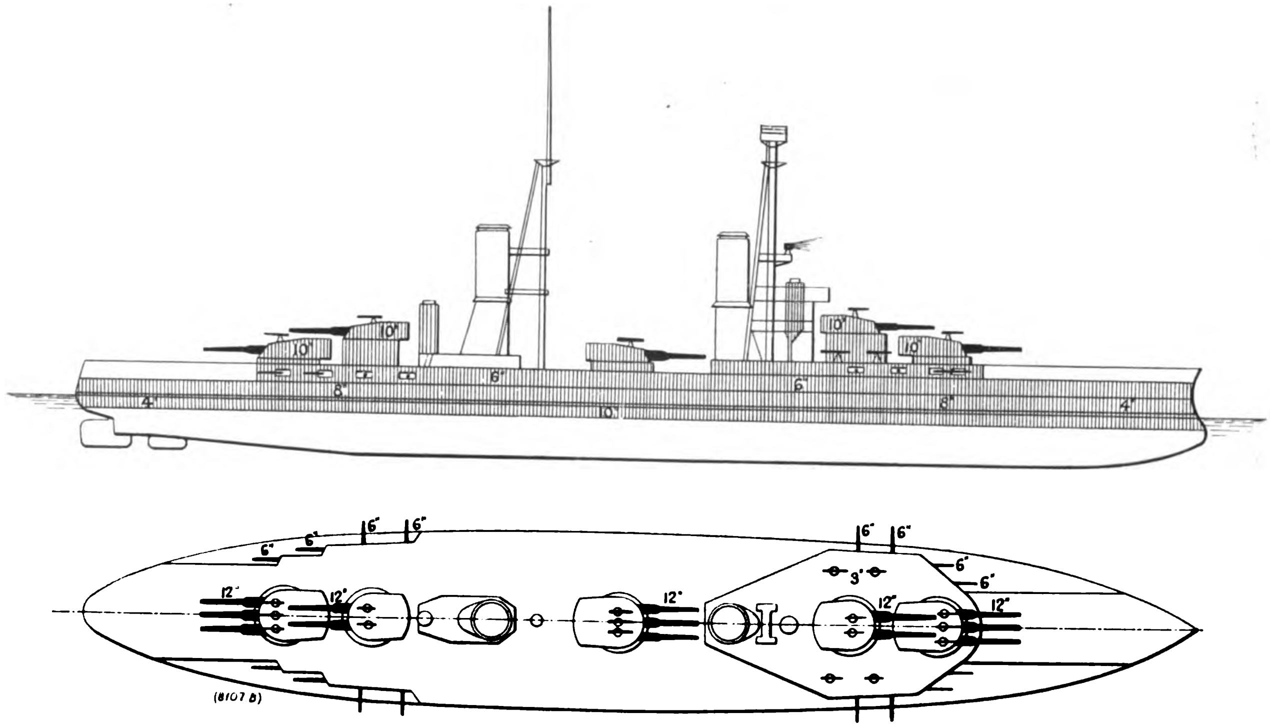


Length, 429 ft. 9 ins.; 9,956 tons; Speed, 24 knots; Completed, 1911.
Armament, 4—9·2-in.; 8—7·5-in.; 16—3-in.; 8 smaller.

ITALY.

BATTLESHIPS.

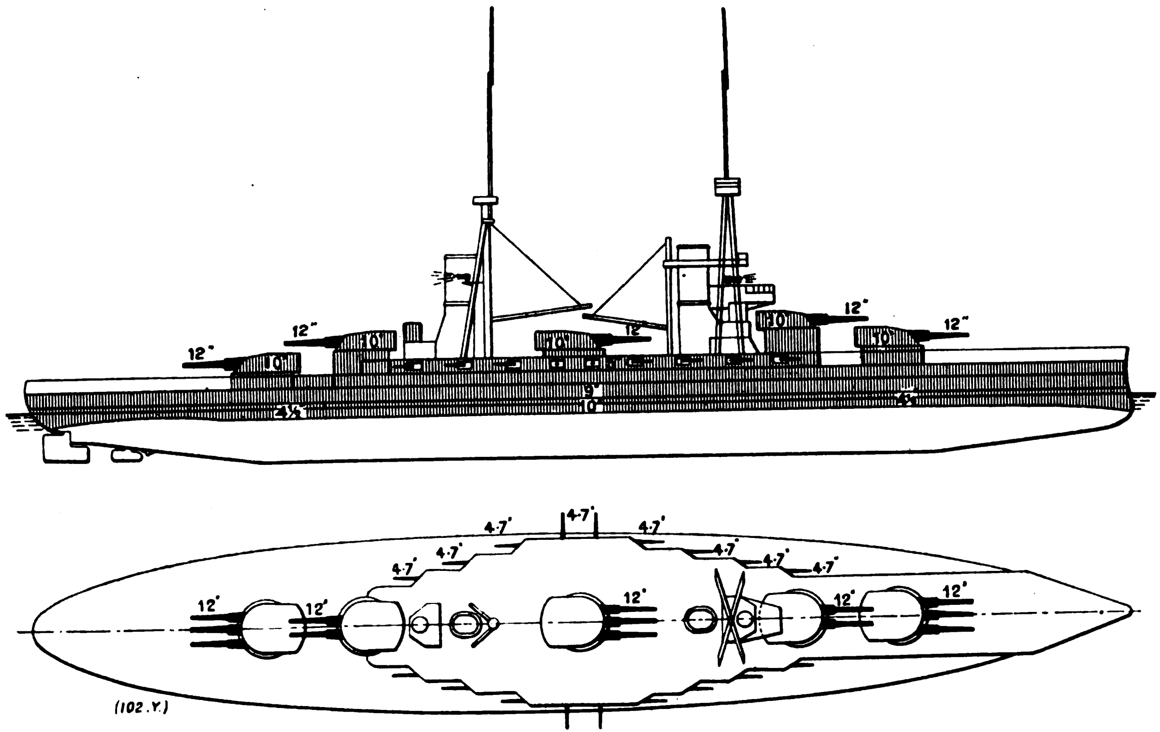
Andrea Doria. Caio Duilio.



Length (extreme), 575 ft. 9 ins. ; Length B.P., 554 ft. 4 ins. ; Speed, 22 knots ; Completed, 1915.
Armament, 13—12-in. ; 16—6-in. ; 13—14 pr. ; 6—14 pr. A.A. ; 2 M. ; 4 L.

ITALY.

Conte di Cavour. Giulio Cesare.

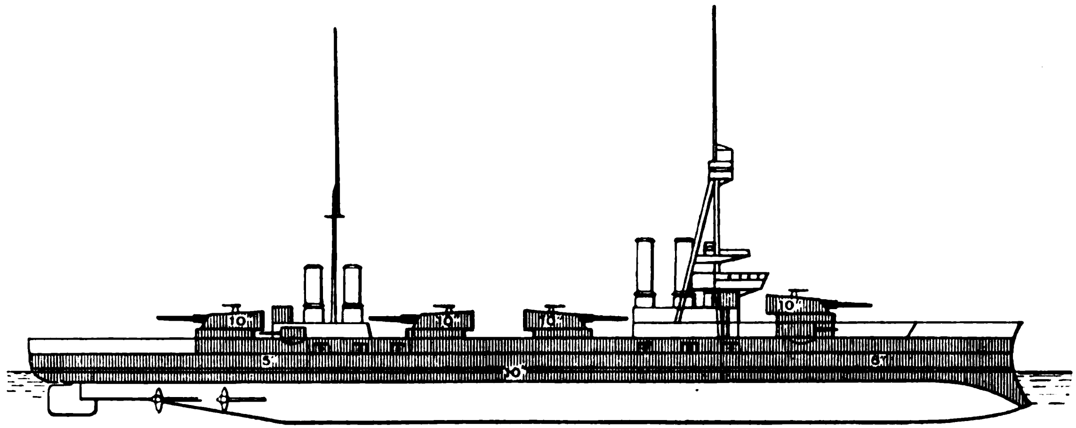


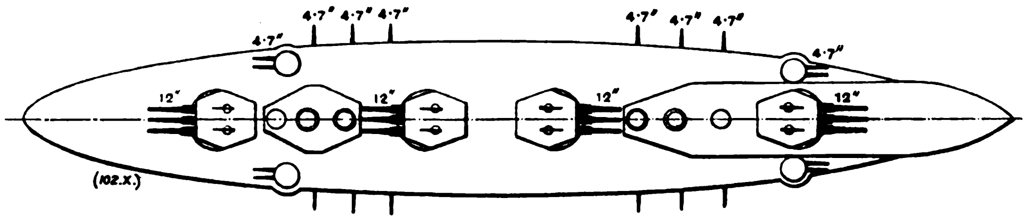
Length (extreme), 575 ft. 9 ins. ; Length B.P., 554 ft. 4 ins. ; Speed, 22 knots ; 22,023 tons ; Completed, 1914-1915.
Armament, 13—12 in. ; 18—4·7 in. ; 13—14 pr. ; 6—14 pr. A.A.

ITALY.

BATTLESHIP.

Dante Alighieri.



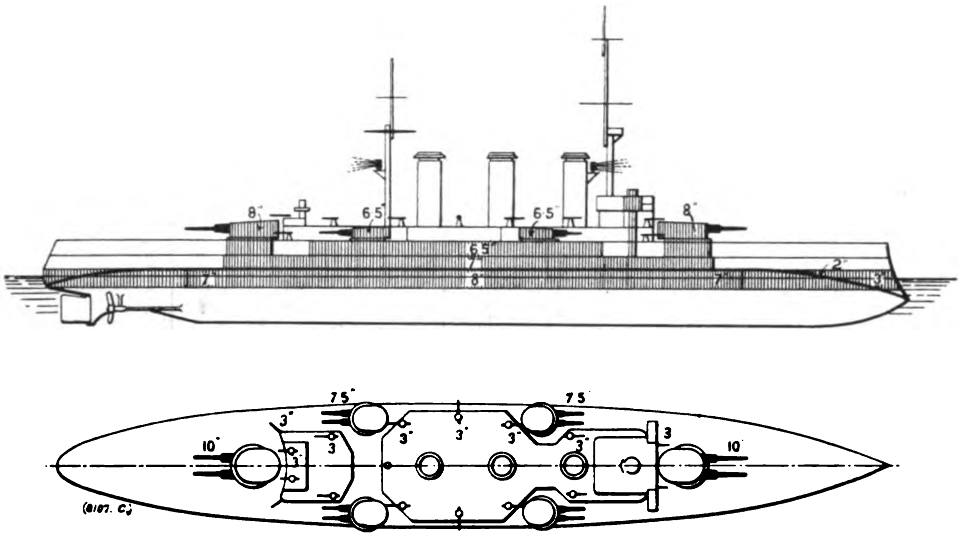


Length (extreme), 549 ft. 6 ins. ; Length B.P., 519 ft. 8½ ins. ; Speed, 23 knots ; 19,400 tons ; Completed, 1912.
Armament, 12—12-in. ; 20—4·7-in. ; 12—14-pr. ; and 6—14-pr. H.A.

ITALY.

ARMOURED CRUISER

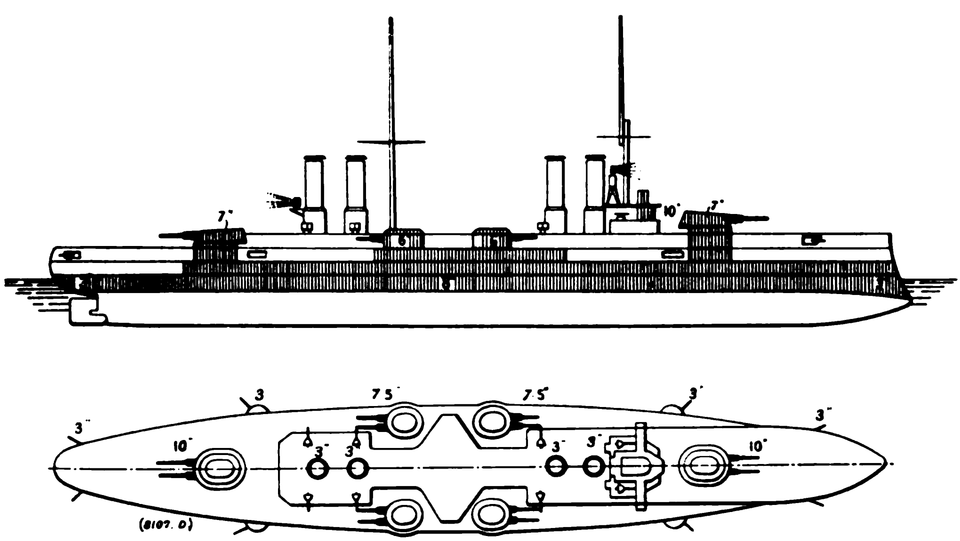
Pisa.



Length (extreme), 460 ft. 11 ins.; Length B.P., 426 ft. 6 ins.; Speed, 23 knots; 10,600 tons; Completed, 1908.
Armament, 4—10-in.; 8—7·5-in.; 14—14-pr.; 6—14-pr. H.A.

ARMOURED CRUISERS.

S. Giorgio. S. Marco.

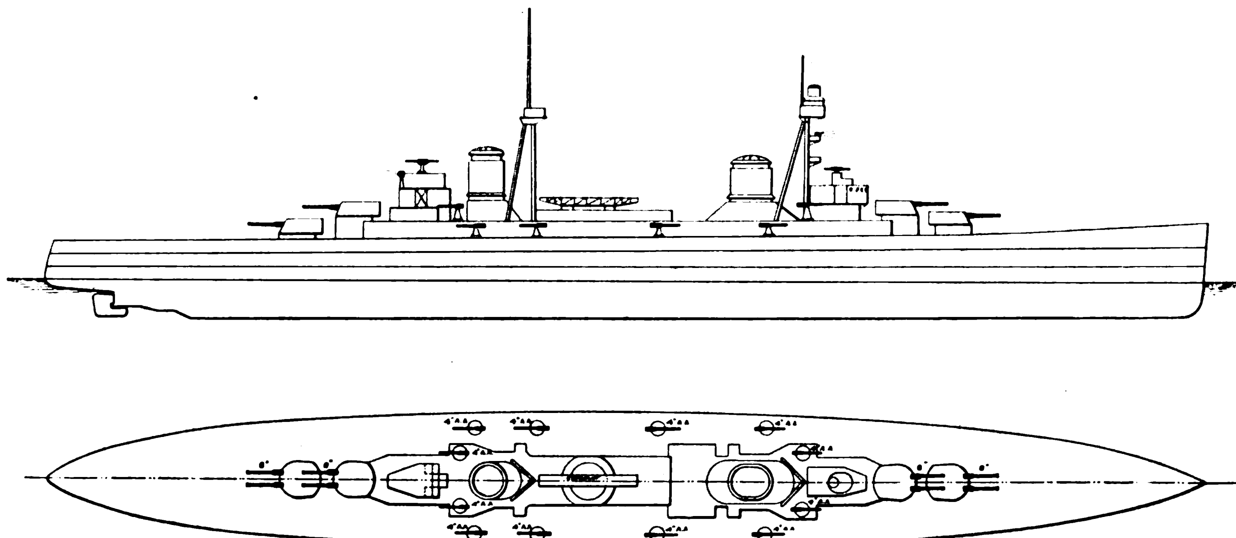


Length (extreme), 462 ft. 2 ins.; Length B.P., 429 ft. 10 ins.;
Speed, 22·5 and 23 knots; 10,800 and 10,000 tons; Completed, 1910.
Armament, 4—10-in.; 8—7·5-in.; 10—14-pr.; 6—14-pr. H.A.

ITALY.

CRUISERS.

Trento. Trieste.

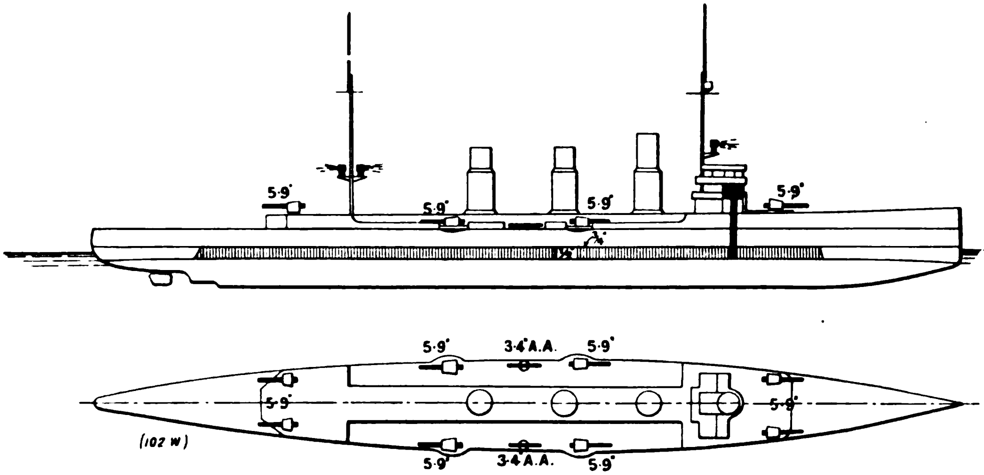


Length (extreme), 642 ft. ; Length B.P., 612 ft. ; 10,000 tons ; Speed, 35-36 knots. Probable date of completion, 1927.
Armament, 8—8-in., 12—4-in. A.A. ; 2 twin 21-in. T.T.'s. Fitted with a catapult. Carries 2 seaplanes.

ITALY.

LIGHT CRUISER.

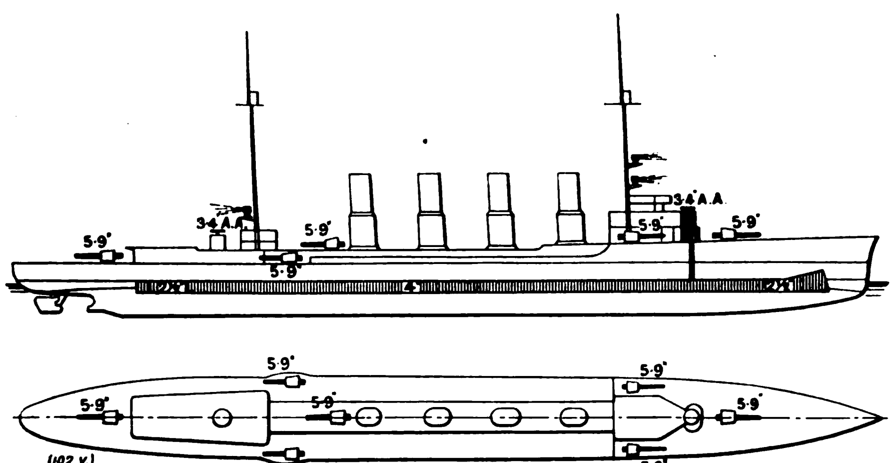
Bari (*ex-German* Pillau).



Length (extreme), 441 ft. ; Length B.P., 403 ft. ; 4,320 tons ; Speed, 27·5 knots ; Completed, 1914.
Armament, 8—5·9.in. ; 3—3-in. A.A. ; 2 above-water torpedo tubes (19·7-in. torpedoes). Can carry 120 mines.

LIGHT CRUISER.

Taranto (*ex-German* Strassburg).

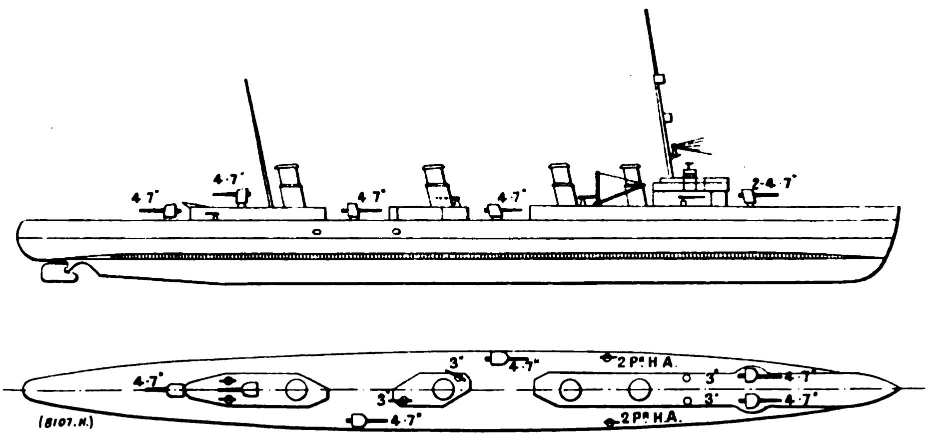


Length (water-line), 446 ft. 3 ins. ; 4,480 tons ; Speed, 26·9 knots ; Completed, 1912.
Armament, 7—5·9-in. ; 2—3-in. A.A. ; 2 torpedo tubes submerged (19·7-in. torpedoes). Can carry 120 mines.

ITALY.

LIGHT CRUISERS.

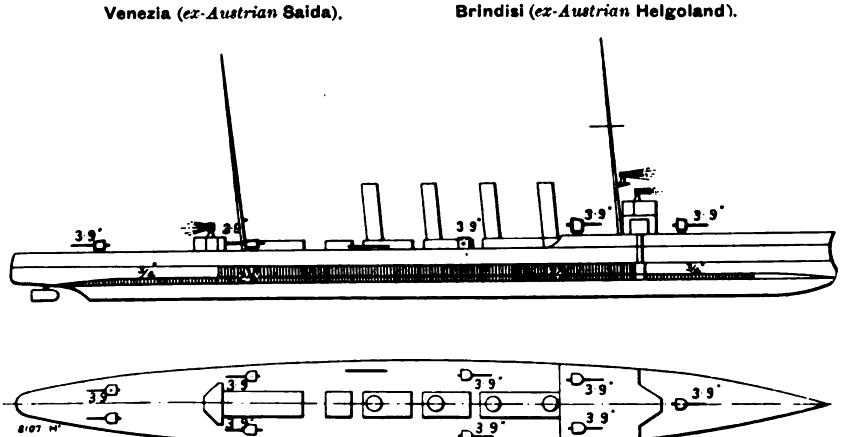
Marsala. **Nino Bixio.**



Length (extreme), 460ft. ; Length B.P., 430 ft. ; Speed, 28 knots ; 3,600 tons ; Completed , 1914.
Armament, 6—4·7-in ; 6—14-pr. ; 2—2-pr. A.A. ; 2 above-water 18-in torpedo tubes ; 150 mines.

LIGHT CRUISERS.

Venezia (*ex-Austrian* **Saida**). **Brindisi** (*ex-Austrian* **Helgoland**).



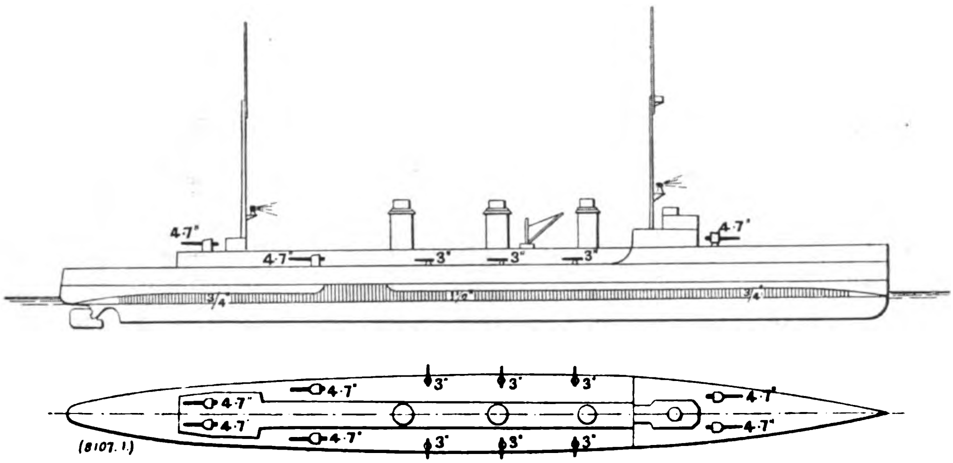
Length (extreme), 430 ft. ; Length (W.L.), 416 ft. 9 ins. ; Speed, 27 knots ; 3,440 tons ; Completed, 1914–15.
Armament, 9—3·9-in. ; 1—3-in. A.A. ; 3 twin above-water torpedo tubes.

NOTE.—Thionville (*ex*-Novara), sister ship, allocated to France.

ITALY.

LIGHT CRUISER.

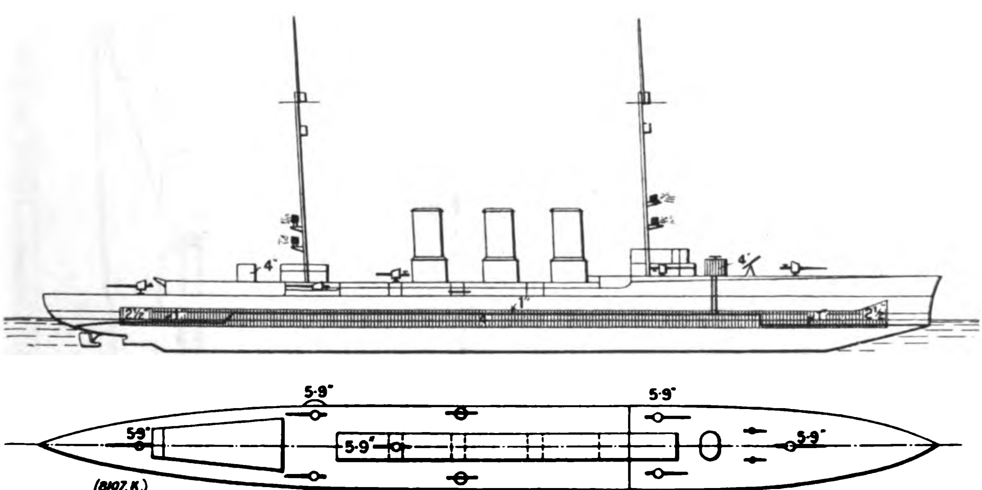
Quarto.



Length (extreme), 431 ft. 9 ins. ; Length B.P., 413 ft. 5 ins. ; Speed, 28 knots ; 3,220 tons ; Completed 1912.
Armament, 6—4·7-in. ; 6—14-pr. ; 2—2-pr. A.A. ; 2 above-water 18-in. torpedo tubes ; 150 mines.

LIGHT CRUISER.

Ancona (*formerly German* Graudenz).

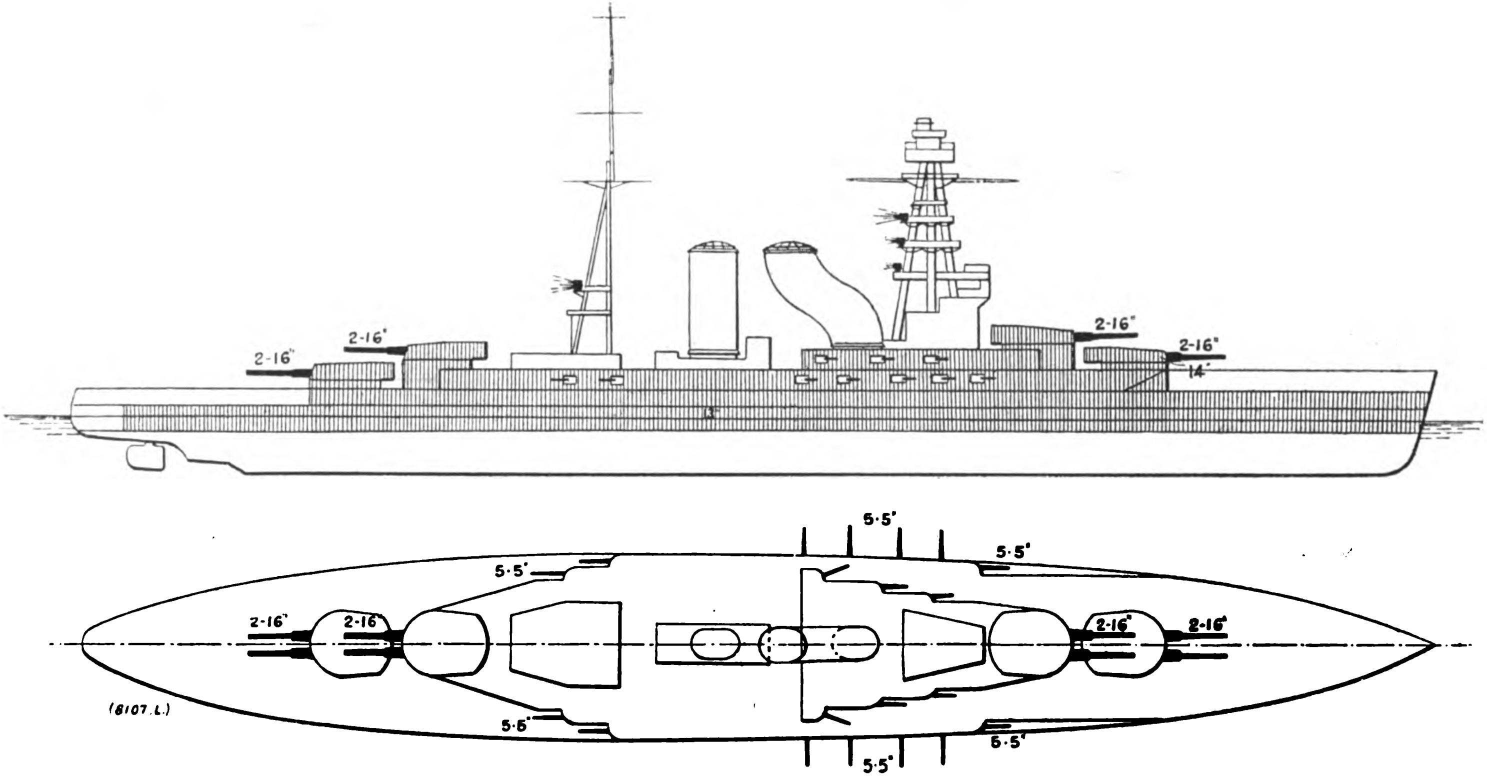


Length (extreme), 456 ft. ; Speed, 27½ knots ; 4,842 tons ; Completed, 1914.
Armament, 7—5·9-in. ; 2—22-pr. A.A. ; 2 submerged and 2 above-water torpedo tubes ; 120 mines.

JAPAN.

BATTLESHIPS.

Nagato. **Mutsu.**

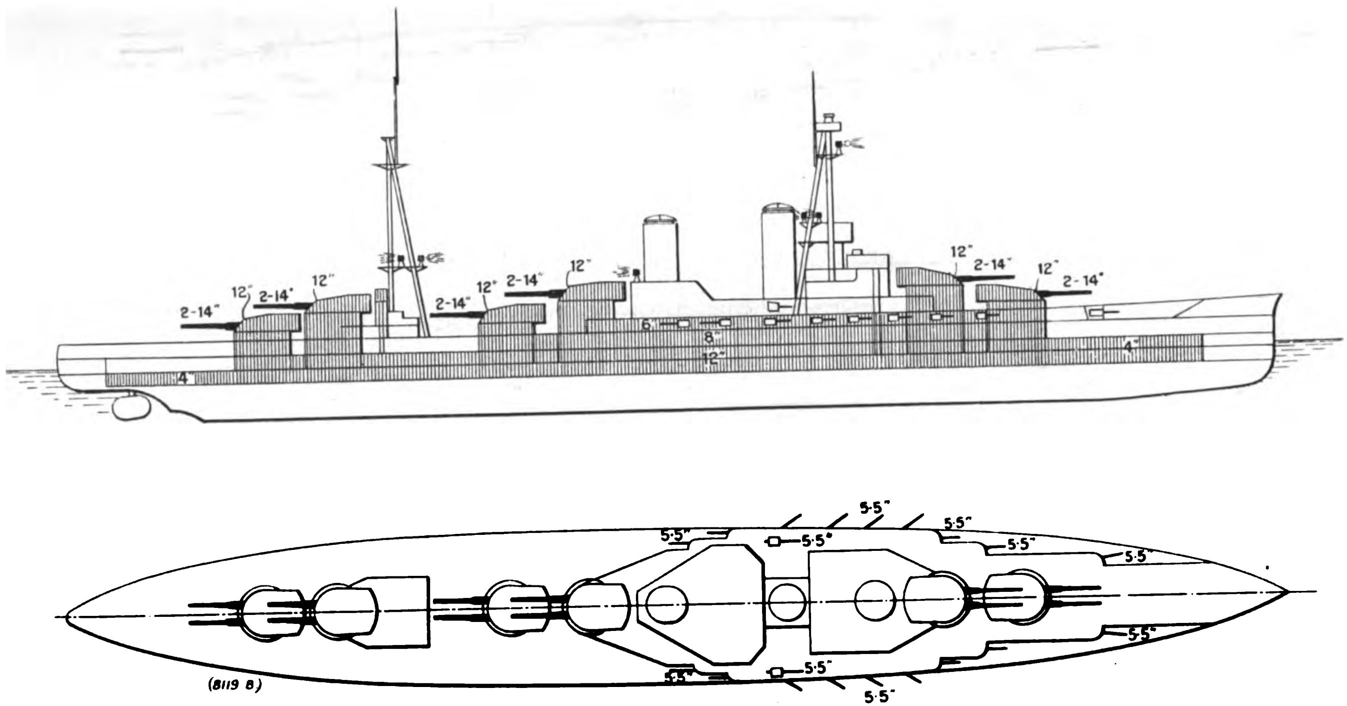


Length (extreme), 700 ft. ; Length B.P., 660 ft. 7 ins. ; Speed, 23 knots ; 33,800 tons ; Completed, 1920-1921.
Armament, 8—16-in. ; 20—5·5-in. ; 4—12-pr. A.A. ; 4 above-water and 4 submerged 21-in. torpedo tubes.

JAPAN.

BATTLESHIPS.

Ise. **Hyuga.**

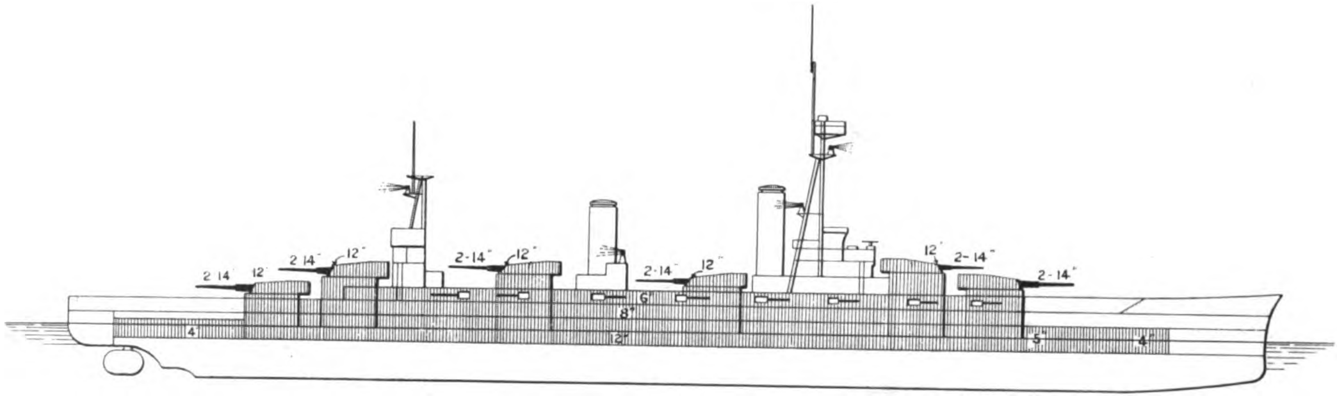


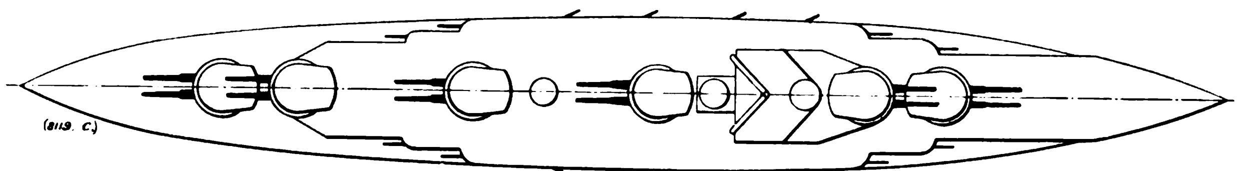
Length (extreme), 683 ft.; Length B.P., 640 ft.; Speed, 23 knots; 31,260 tons; Completed, 1917-18.
Armament, 12–14-in; 20—5·5-in.; 4—12-pr. A.A.; 6 submerged 21-in. torpedo tubes.

JAPAN.

BATTLESHIPS.

Fuso. **Yamashiro.**



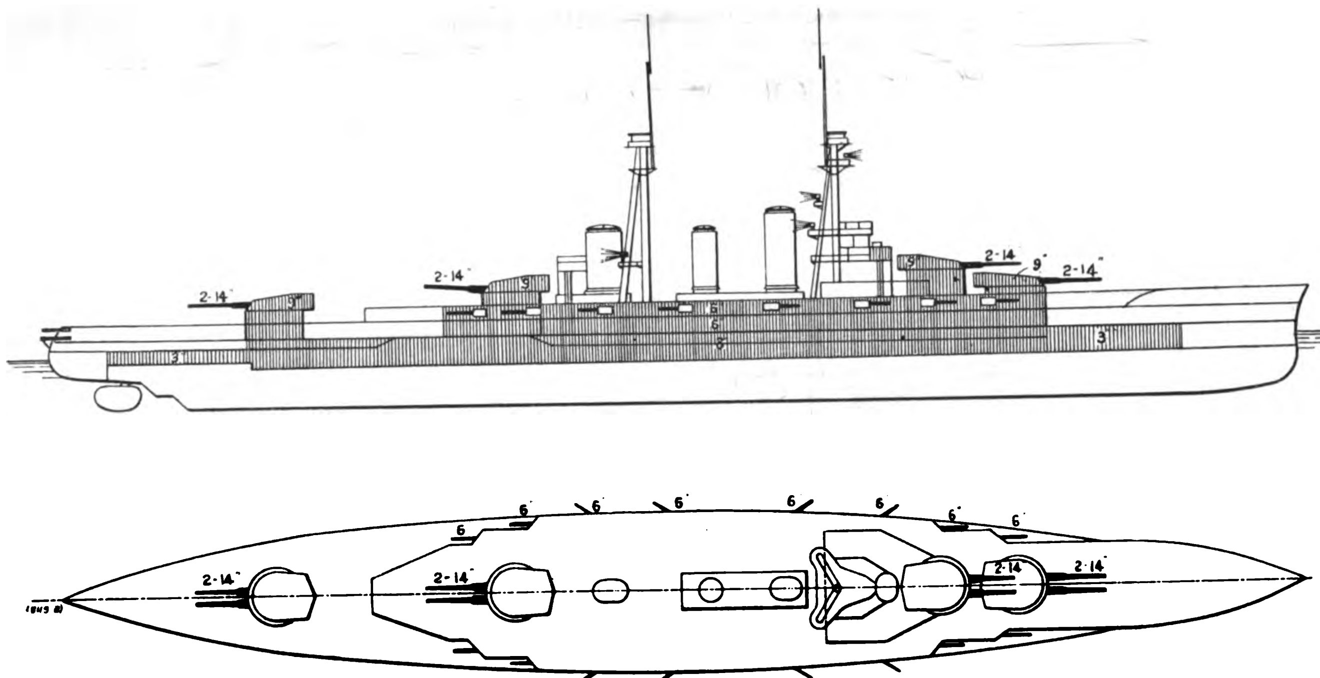


Length (extreme), 673 ft.; Length B.P., 630 ft.; Speed, 22·5 knots; 30,600 tons; Completed, 1915–17.
Armament, 12—14-in.; 16—6-in.; 4—12-pr. A.A.; 6 submerged 21-in. torpedo tubes.

JAPAN.

BATTLE-CRUISERS.

Kongo. Hiyei. Haruna. Kirishima.



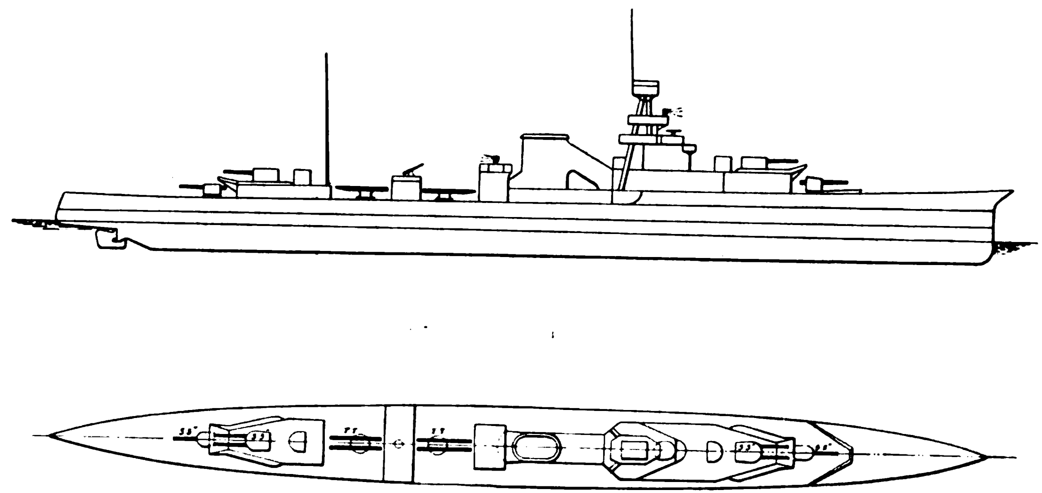
Length (extreme), 704 ft.; Length B.P., 653 ft. 6 ins.; Speed, 27·5 knots; 27,500 tons; Completed, 1913–15.
Armament, 8—14-in.; 16—6-in.; 4—12-pr. A.A.; 8 submerged, 21-in. torpedo tubes.

NOTE.—Funnels as shown for Kongo; in the other three ships the forward funnel is slightly farther aft.

JAPAN.

LIGHT CRUISER.

Yubari.



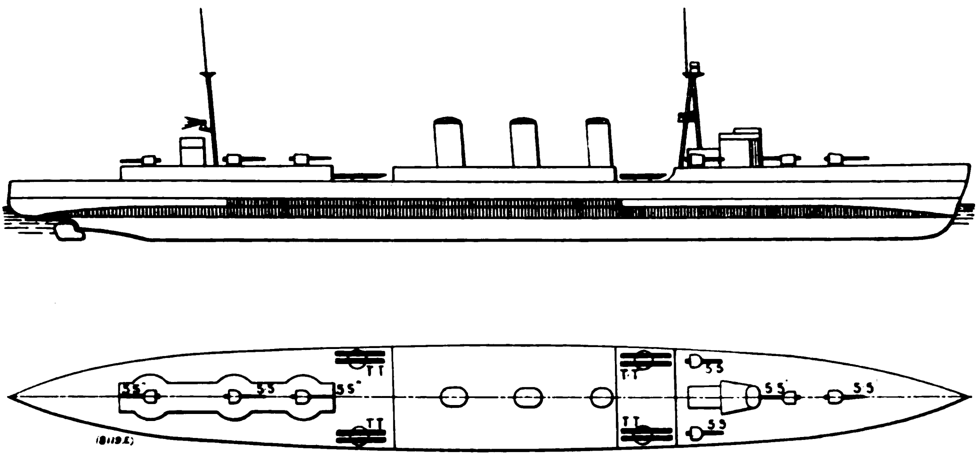
Length (extreme), 465 ft.; Length B P., 435 ft.; 3,100 tons; Speed, 33 knots. Completed, 1923.
Armament, 6—5·5-in.; 1—12-pr. A.A.; 2 M.; 2 twin 21-in. T.T.'s.

JAPAN.

LIGHT CRUISERS.

* Isudzu. Nagara. | Natori. Yura. | Abukama. Kinu. | Jintsu. Sendai.

Oh-I. | Kiso. | Kitakami. | Tama. | Kuma.

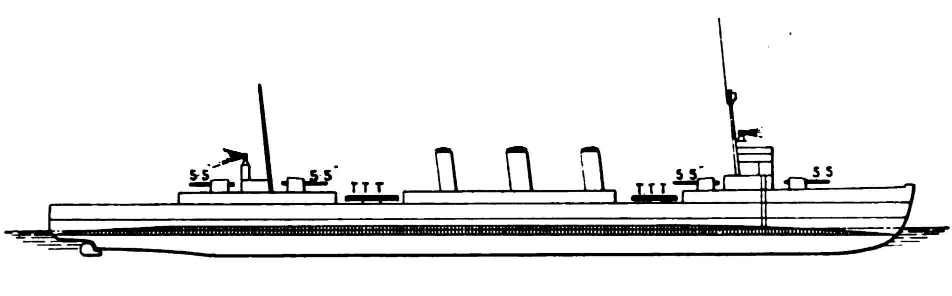


Length (extreme), 535 ft. ; Length B.P., 500 ft. ; Speed, 33 knots ; 5,500 tons ; Completed, 1920-21.
Armament, 7—5·5-in. ; 3—12-pr. A.A. ; 4 twin above-water 21-in torpedo tubes.

*** Plans apply generally to these vessels except that aircraft hangar is arranged in bridge structure. The displacement is about 70 tons higher than Oh-I, etc. These vessels were completed, 1921-25.**

LIGHT CRUISERS.

Tatsuta. | Tenryu.

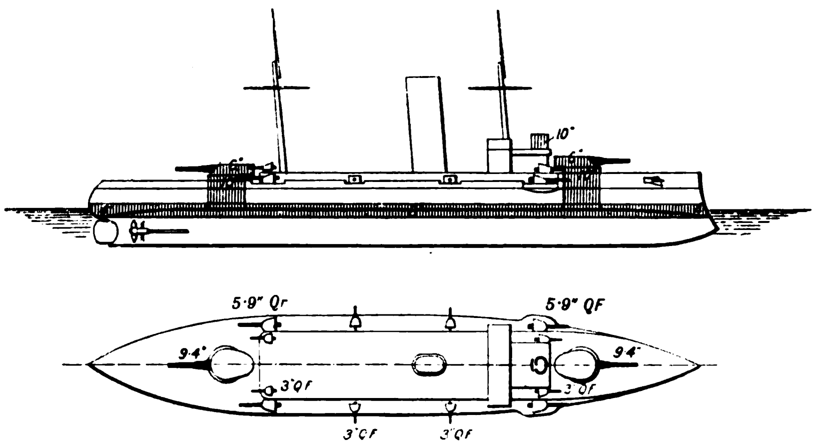


Length (extreme), 450 ft. ; Speed, 33 knots ; 3,500 tons ; Completed, 1919.
Armament, 4—5·5-in. ; 1—12-pr. A.A. ; 2 triple above-water torpedo tubes.

NETHERLANDS.

COAST DEFENCE SHIPS.

De Ruyter. **Hertog Hendrik.** **Marten Tromp.**

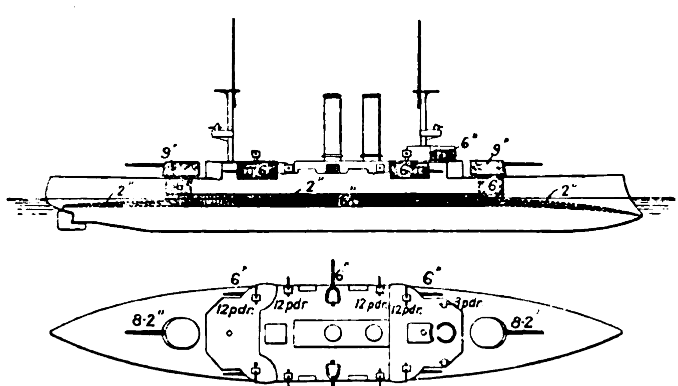


Length, 316½–330 ft.; 5000—5216 tons; Speed, 14·5 knots; Completed, 1903—1906.
Armament, De Ruyter and Hertog Hendrik: 2—9·4-in.; 6—5·9-in.; 4—2·9-in.; 4 or 6 small.
Marten Tromp: 2—9·4-in.; 4—5·9-in.; 8—2·9-in.; 6 small.

NORWAY.

COAST DEFENCE SHIPS.

Norge. **Eidsvold.**

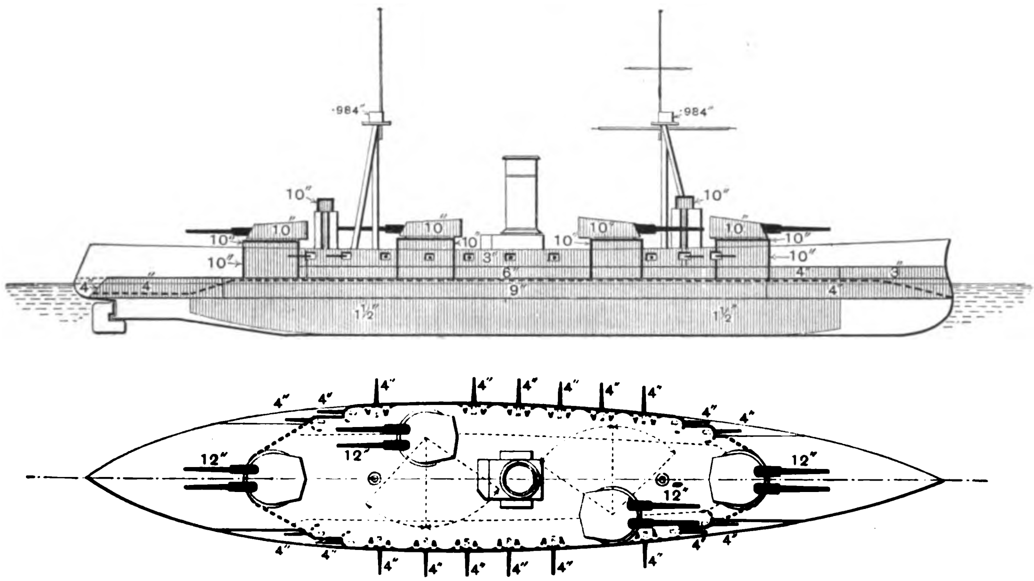


Length, 290 ft.; 4,233 tons; Speed, 16·9 knots; Completed, 1901.
Armament, 2—8·2-in.; 6—6-in.; 8—12-pr.; 6 small.

SPAIN.

BATTLESHIPS.

Alfonso XIII. España.* Jaime I.

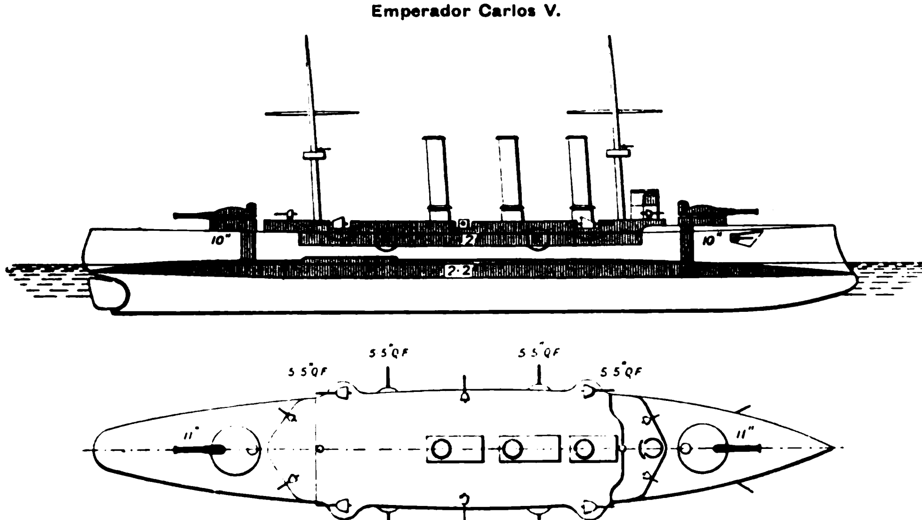


Length (extreme), 459 ft. ; Length W.L., 435 ft. ; 15,460-15,700 tons ; Speed, 19·5 knots to 20·2 knots ; Completed, 1913-1916. Armament, 8—12-in. ; 20—4-in. ; 6 small.

*** España wrecked in August, 1923.**

ARMOURED CRUISER.

Emperador Carlos V.

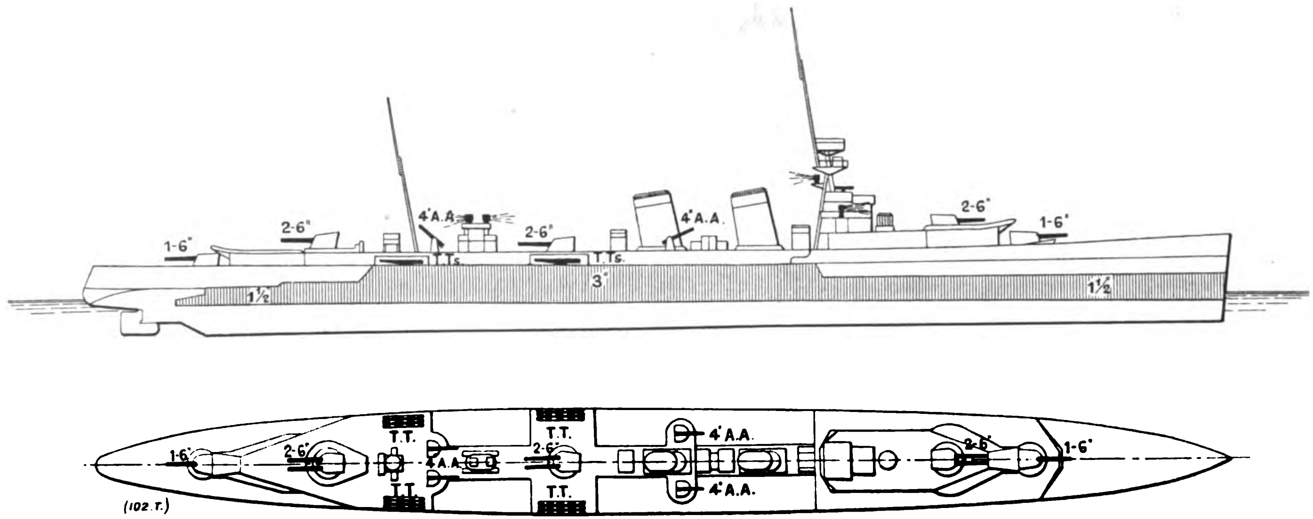


Length, 404 ft. ; 9,900 tons ; Speed, 19 knots ; Completed, 1898. Armament, 2—11-in. ; 8—5·5-in. ; 4—4·1-in. ; 22 small.

SPAIN.

LIGHT CRUISERS.

Principe Alfonso. Almirante Cervera.

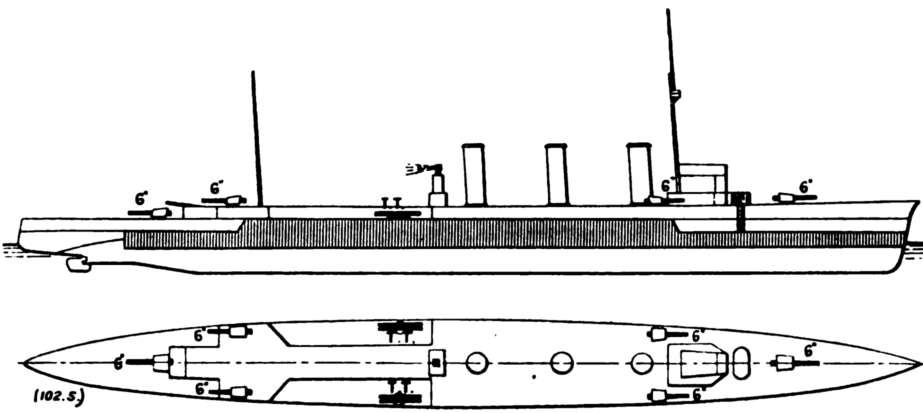


Length (extreme), 579 ft. 6 in.; Length, B.P., 545 ft.; 7,850 tons; Speed, 33 knots. (Building.)
Armament, 8—6-in.; 4—4-in. A.A., 2—3 pr., 4 triple above-water torpedo tubes (21-in. torpedoes).

SPAIN.

LIGHT CRUISERS.

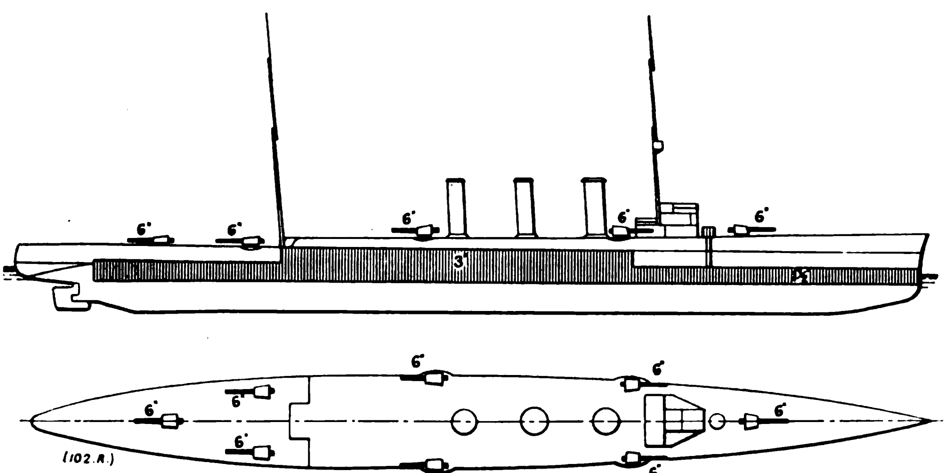
Don Blas Lezo. Mendez Nuñez.



Length (extreme), 462 ft. ; Length B.P., 439 ft. ; 4,700 tons ; Speed, 29 knots. Completed 1924.
Armament, 6—6-in. ; 4—3-pr. A.A. ; 4 M. ; 4 above-water triple torpedo tubes (21-in. torpedoes).

LIGHT CRUISER.

Reina Victoria Eugenia.



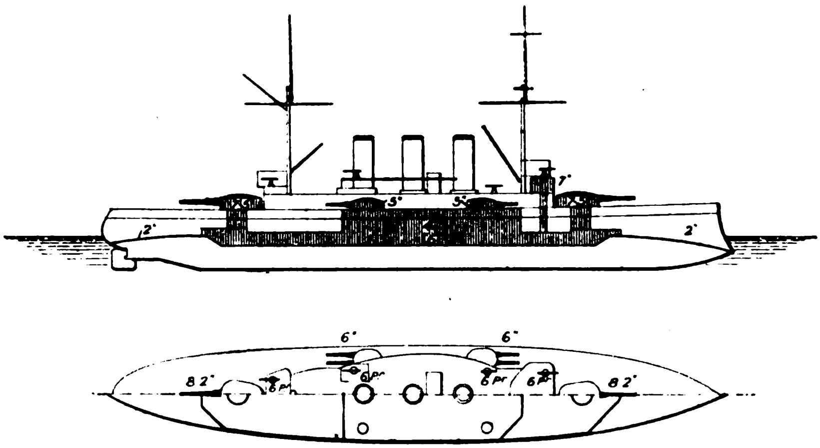
Length (extreme), 462 ft. ; 5,700 tons ; Speed, 25¼ knots ; Completed, 1922.
Armament, 9 *—6-in. ; 1—12-pr. ; 4—3-pr. A.A. ; 4 M. ; 1 L. ; 4 torpedo tubes.

* Note.—There should be two 6-in. guns abreast forward instead of one on the centre line as shown.

SWEDEN.

BATTLESHIP.

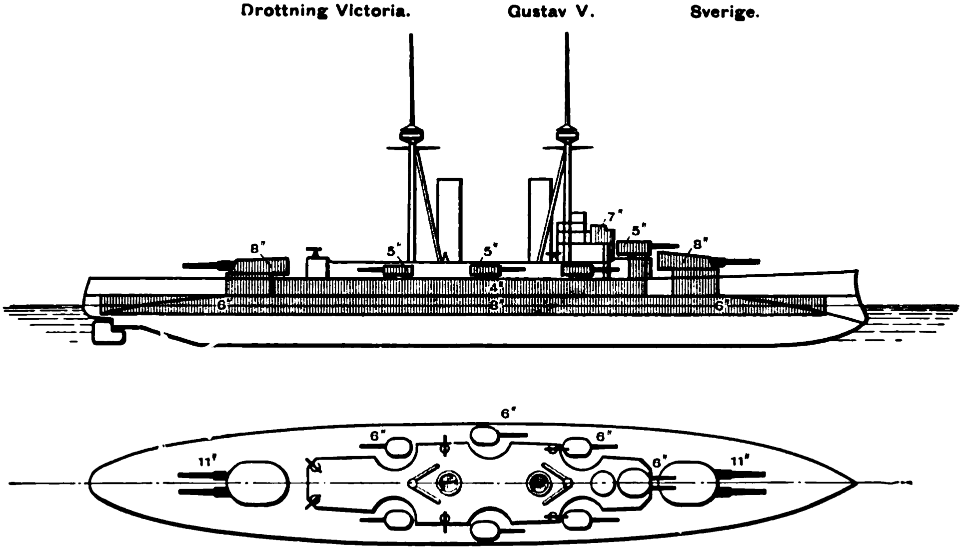
Oscar II.



Length, 313·6 ft. ; 4,658 tons ; Speed, 18 knots ; Completed, 1907.
Armament, 2—8·2-in. ; 8—6-in. ; 14 small.

ARMOURED CRUISERS.

Drottning Victoria. **Gustav V.** **Sverige.**

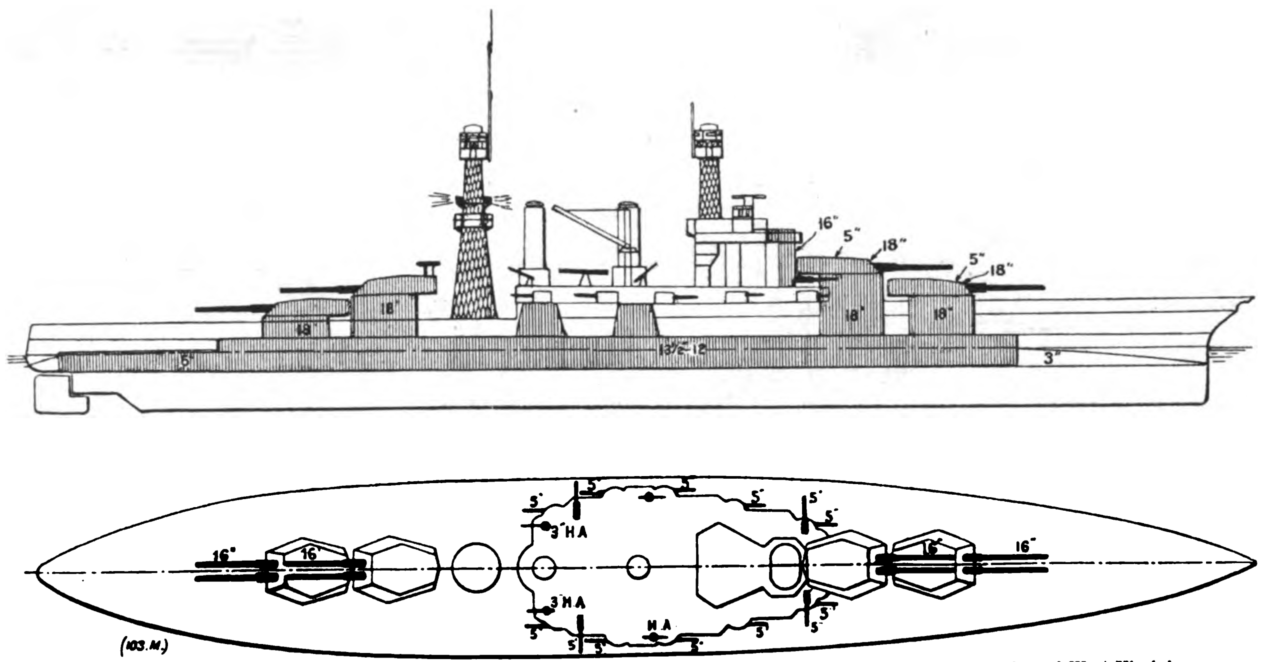


Length, 396·7 ft. ; 7,605 tons ; Speed, 22 knots ; Completed, 1917-1922.
Armament, 4—11-in. ; 8—6-in. ; 6—12-pr. ; 4 small.

UNITED STATES.

BATTLESHIPS.

Colorado. Maryland. West Virginia.



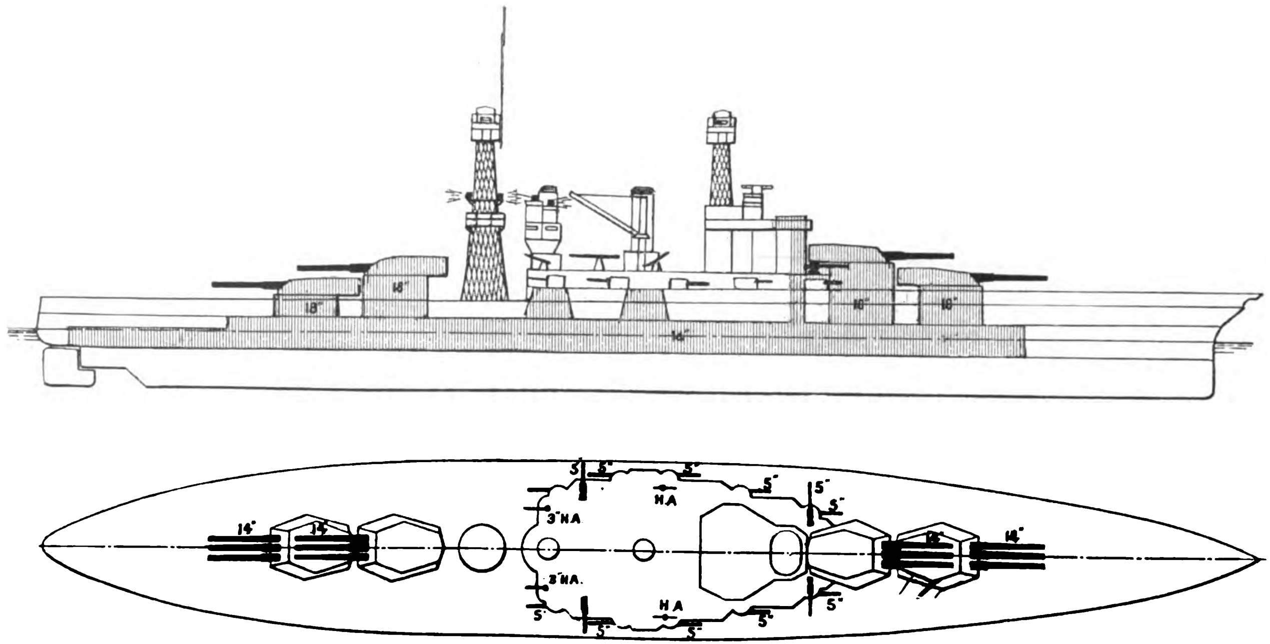
Length (extreme), 624 ft. ; Length W.L., 600 ft. ; Speed, 21 knots ; 32,600 tons ; Maryland, completed, 1921 ; Colorado and West Virginia, completed, 1923.

Armament, 8—16-in. ; 12—5-in. ; 8—3-in. A.A. ; 4—6-pr. ; 2 submerged 21-in. torpedo tubes.

UNITED STATES.

BATTLESHIPS.

California. **Tennessee.**

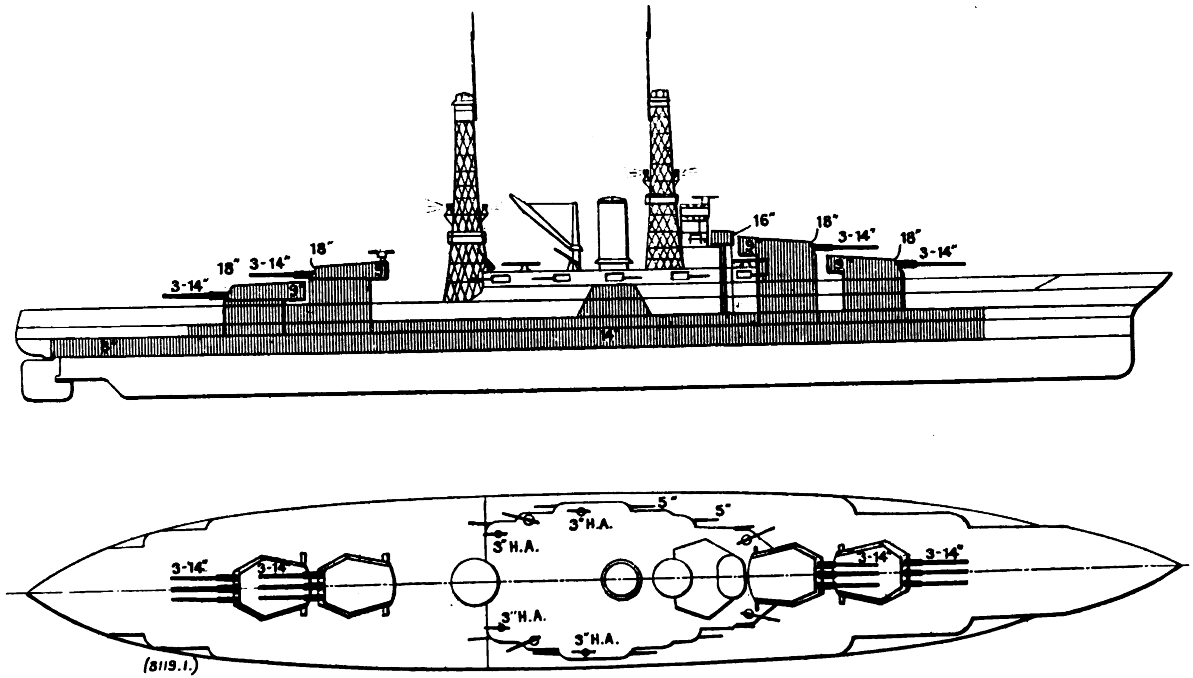


Length (extreme), 624 ft. ; Length W.L., 600 ft. ; Speed, 21 knots ; 32,300 tons ; Completed, 1920-21.
Armament, 12—14-in. ; 12—5-in. ; 8—14-pr. A.A. ; 4—6-pr. : 2 submerged 21-in. torpedo tubes.

UNITED STATES.

BATTLESHIPS.

Idaho. **New Mexico.** **Mississippi.**



(8119.1.)

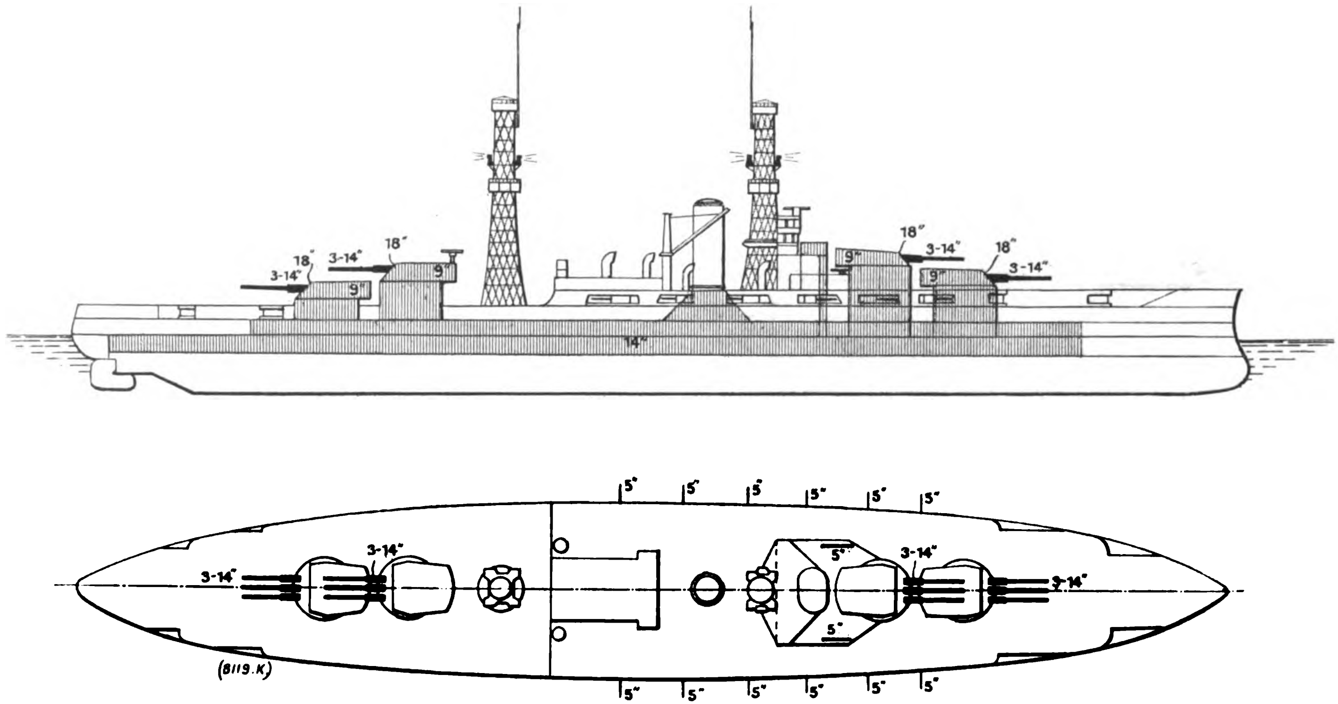
Length (extreme), 624 ft.; Length W.L., 600 ft.; Speed, 21 knots; 32,000 tons; Completed, 1917–19.
Armament, 12—14-in.; 12—5-in.; 8—14-pr. A.A.; *4—6-pr.; 2 submerged 21-in. torpedo tubes.

* Idaho, 4—3-pr.

UNITED STATES.

BATTLESHIPS.

Arizona. **Pennsylvania.**

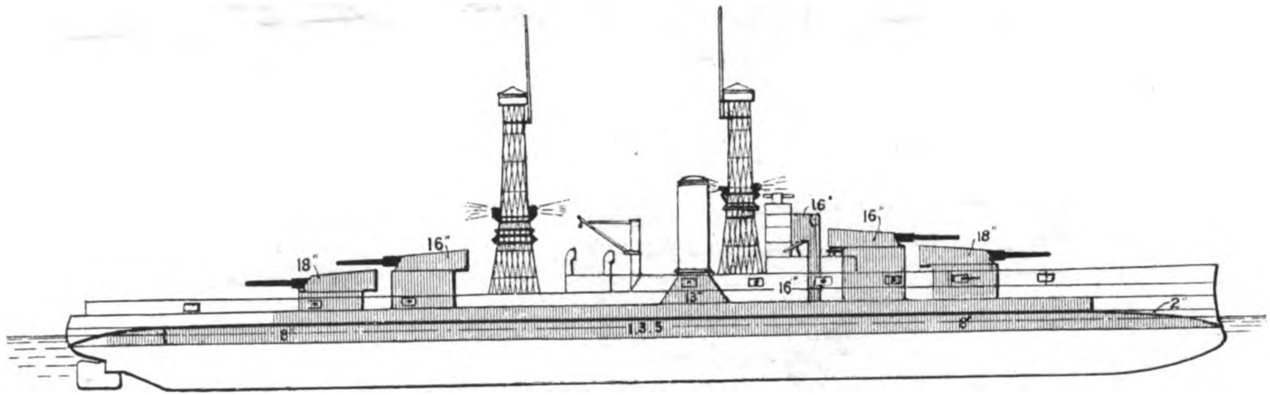


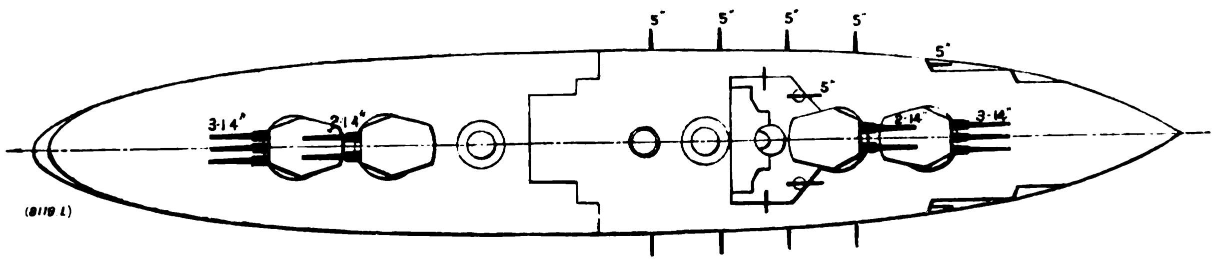
Length (extreme), 608 ft.; Length B.P., 596 ft.; Speed, 21 knots; 31,400 tons; Completed, 1916.
Armament, 12—14-in.; 14—5-in.; 8—3-in. A.A.; 4—3-pr.; 2 submerged 21-in. torpedo tubes.

UNITED STATES.

BATTLESHIPS.

Nevada. **Oklahoma.**





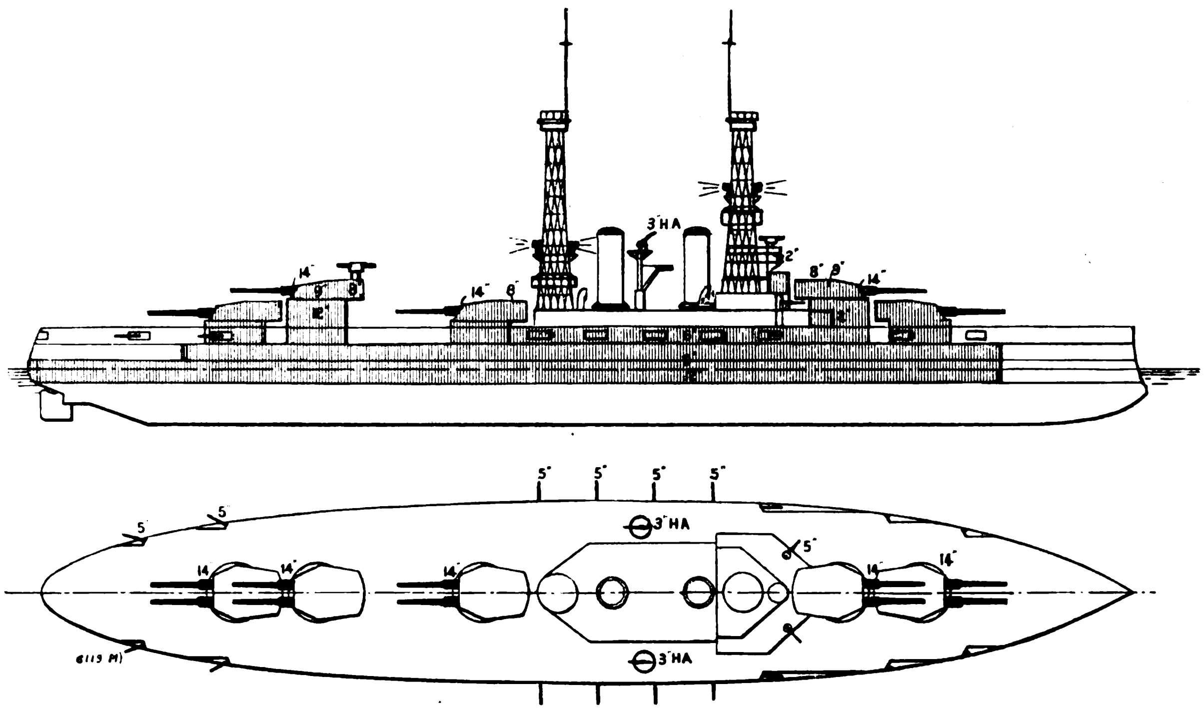
(8119 L)

Length (extreme), 583 ft. ; Length W.L., 575 ft.; Speed, 20·5 knots ; 27,500 tons ; Completed, 1916.
Armament. 10—14-in. ; 12—5-in. 8—3-in. A.A. ; 4—3-pr. 2 submerged 21-in. torpedo tubes.

UNITED STATES.

BATTLESHIPS.

New York. Texas.

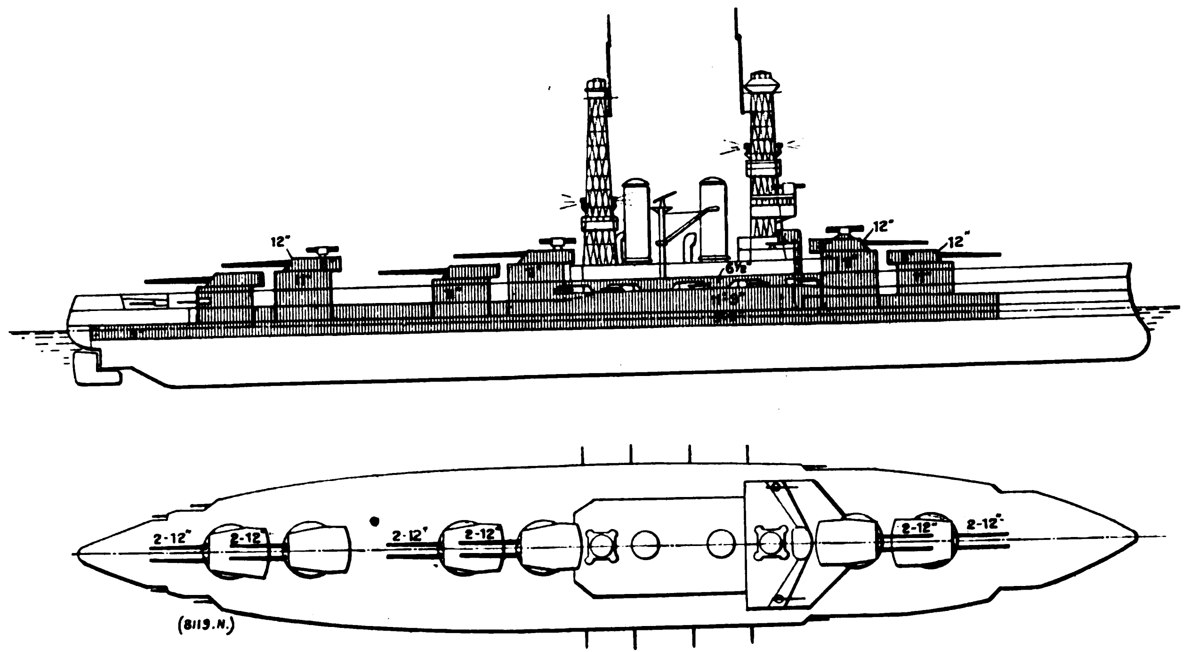


Length (extreme), 573 ft. ; Length W.L., 565 ft. ; Speed, 21 knots ; 27,000 tons ; Completed, 1914.
Armament, 10—14-in. ; 16—5 in. ; 8—3-in. A.A. ; 4—3-pr. ; 4 submerged 21-in. torpedo tubes.

UNITED STATES.

BATTLESHIPS.

Arkansas. **Wyoming.**



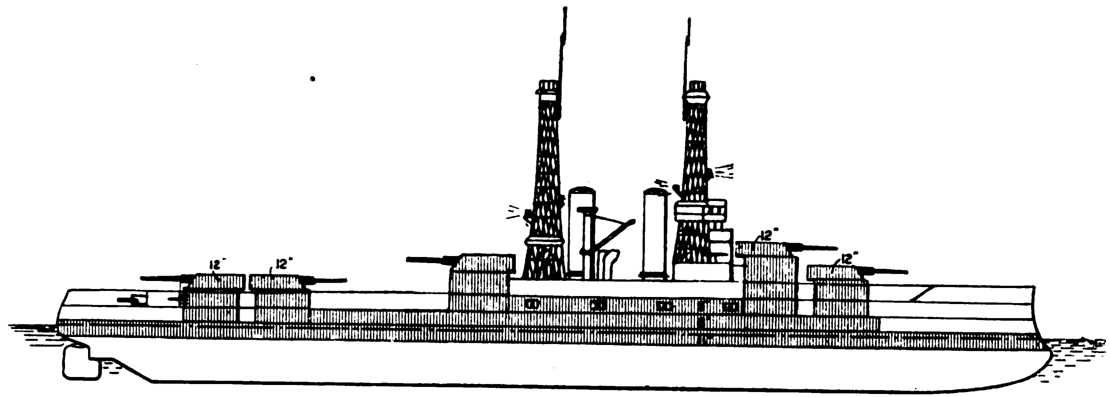
Length (extreme), 562 ft.; Length W.L., 554 ft.; Speed, 20·5 knots; 26,000 tons; Completed, 1912.
Armament, 12—12 in.; 16—5 in.; 8—3 in. A.A.; 4 or 6*—3-pr.; 2 submerged 21-in. torpedo tubes.

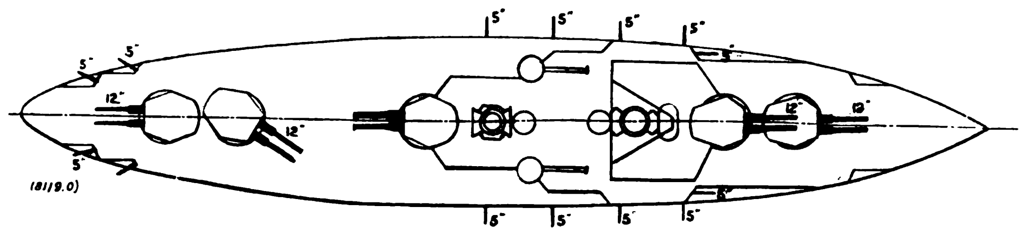
* Wyoming.

UNITED STATES.

BATTLESHIPS.

Utah. Florida.





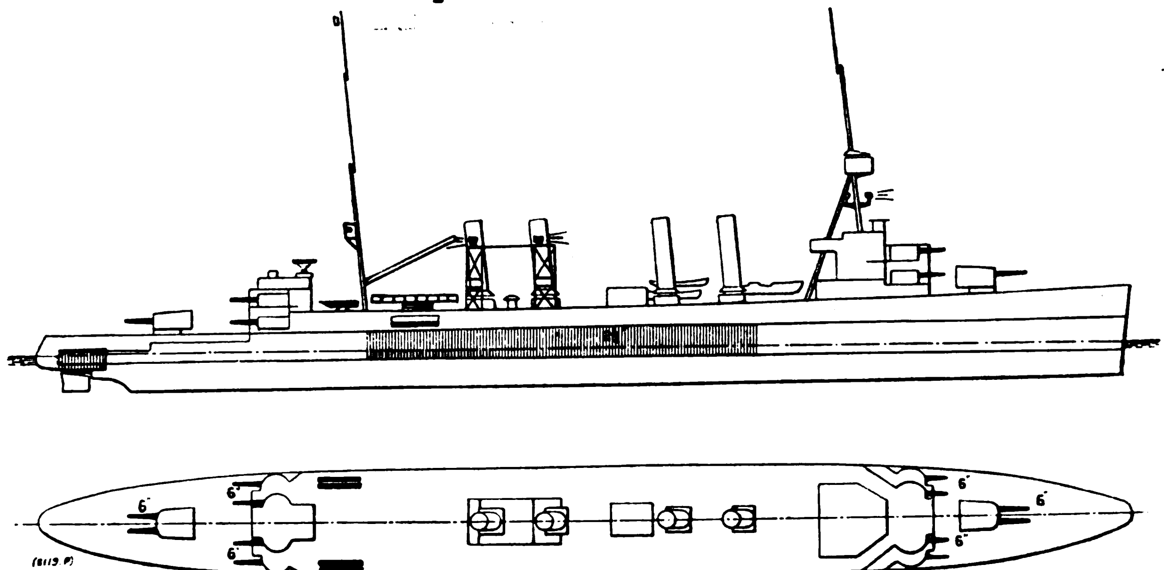
Length (extreme), 521 ft. 6 ins. ; Length W.L., 510 ft. ; Speed, 20·75 knots ; 21,825 tons ; Completed, 1911.
Armament, 10—12-in. ; 16—5-in. ; 8—3-in. A A. ; 4 or *6—3-pr. ; 2 submerged 21-in. torpedo tubes.

* Florida.

UNITED STATES.

SCOUT CRUISERS.

Cincinnati.	Concord.	Detroit.	Marblehead.	Memphis.	Milwaukee.	Omaha.
		Raleigh.	Richmond.	Trenton.		



Length (extreme), 555 ft. 6 ins.; Length W.L., 550 ft.; Speed, 33·7 knots; 7,500 tons Completed in 1923–25.
Armament, 12—6-in.; 4—3-in. A.A.; 2—3-pr.; 2 twin and 2 triple above-water 21-in. torpedo tubes.

BRITISH AND FOREIGN ORDNANCE TABLES.

VICKERS' GUNS AND MOUNTINGS.

Naval Guns and Mountings.

	37-mm. 1-pdr. auto. 30 cal.	37-mm. 1½-pdr. auto. 42·5 cal.	40-mm. 2-pdr. auto. 40 cal.	47-mm. 3-pdr. semi-auto. 50 cal.	57-mm. 6-pdr. semi-auto. 50 cal.	3-in. semi-auto. 50 cal.	4-in. semi-auto. 40 cal.	4-in. semi-auto. 45 cal.	101·6-mm. 4-in. 50 cal.	120-mm. 4·7-in. 45 cal.	120-mm. 4·7-in. 50 cal.	152-mm. 6-in. 45 cal.
Construction	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore . ins.	1·457	1·457	1·575	1·85	2·244	3	4	4	4	4·724	4·724	6
Length of bore . ins.	43·5	62	62	92·5	112·2	150	160	180	200	212·58	236·2	270
Length of gun . ins.	73·75	94	95·7	98·9	118·6	157	166·6	187·8	207·3	219·784	243·4	279·728
Weight of gun	432 lb.	490 lb.	616 lb.	6 cwts.	c. q. 9 1	c. q. 19 0	c. q. 25 0	c. q. 36 0	c. q. 40 0	t. c. 3 2	t. c. 3 4	t. c. 6 10
Weight of projectile . lbs.	1	1·5	2	3·3	6	12·5	31	31	31	48·5	50	100
Muzzle velocity . f.s.	1,800	2,100	2,000	2,800	2,600	2,700	2,300	2,700	3,000	2,789	2,900	2,850
Muzzle energy . f.t.	22·5	46	55·5	180	280	630	1,135	1,565	1,935	2,616	2,916	5,630
Penetration of W.I. plate at muzzle, Gavre formula. Uncapped projectile . ins.	—	—	—	6·7	7·5	9·65	10·8	13·6	16	16·6	17·8	22
Rounds per minute	200	200	200	30	28	25	20	18	15	12	12	10
Weight of mounting and shield	—	—	1,040 lb.	c. q. lb. 11 2 5	c. q. lb. 17 3 10	t. c. q. lb. 1 3 1 10	t. c. q. lb. 2 9 3 24	t. c. q. lb. 2 18 3 0	t. c. q. lb. 3 5 0 27	t. c. q. 3 5 2	t. c. q. 4 1 0	t. c. q. l. 12 9 2 3
Angle of elevation . deg.	—	—	80°	20°	20°	20°	30°	30°	30°	35°	35°	30°
Angle of depression . deg.	—	—	5°	10°	10°	10°	10°	10°	10°	10°	10°	5°
Weight of shield	—	—	—	c. q. lb. 1 0 20	c. q. lb. 1 2 10	c. q. lb. 2 0 14	c. q. lb. 7 2 0	c. q. lb. 7 2 0	c. q. lb. 14 1 13	c. q. lb. 9 0 0	—	t. c. q. lb. 4 4 3 16
Thickness of shield	—	—	—	·22	·25	·25	·144	·144	·25	·144	—	1·5 and 1

Naval Howitzers.

	152-mm. 6-in. 50 cal.	152-mm. 6-in. semi-auto. 50 cal.	20·3-mm. 8-in. 50 cal.	203-mm. 8-in. 55 cal.	254-mm. 10-in. 45 cal.	254-mm. 10-in. 50 cal.	305-mm. 12-in. 45 cal.	305-mm. 12-in. 50 cal.	343-mm. 13·5-in. 45 cal.	356-mm. 14-in. 45 cal.	356-mm. 14-in. 50 cal.	381-mm. 15-in. 45 cal.	406-mm. 16-in. 45 cal.	120-mm. 4·7-in. How. 18 cal.	280-mm 11-in. How. 8 cal.
Construction	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore . ins.	6	6	8	8	10	10	12	12	13·5	14	14	15	16	4·724	11
Length of bore . ins.	300	300	400	440	450	500	540	600	607·5	630	700	675	720	85	88
Length of gun . ins.	309·728	311·17	413·1	453·1	464	514	556·5	616·5	625·9	648·4	718·4	695·7	742·2	89·9	96·6
Weight of gun	t. c. 6 18	t. c. 8 5	t. c. 15 0	t. c. 16 10	t. c. 23 10	t. c. 26 1	t. c. 40 0	t. c. 43 10	t. c. 66 0	t. c. 73 0	t. c. 80 0	t. c. 87 0	t. c. 105 0	c. q. 11 1	t. c. 1 18
Weight of projectile .	100	100	256	256	500	500	850	850	1,400	1,350	1,350	1,660	2,000	45	350
Muzzle velocity . f.s.	3,000	2,900	3,000	3,150	2,800	2,933	2,800	2,933	2,500	2,756	2,900	2,700	2,650	1,200	585
Muzzle energy . f.t.	6,240	5,830	15,976	17,615	27,180	29,825	46,210	50,705	60,675	71,100	78,725	83,915	97,390	450	830
Penetration of W.I. plate at muzzle, Gavre formula. Uncapped projectile . ins.	23·7	22·6	34·5	38	39·2	41·7	47·3	50·3	51·5	54·5	58·3	57	59	—	—
Rounds per minute	10	10	6	6	3	3	2	2	1·5	1·35	1·35	1·2	1·2	12	—
Weight of mounting and shield	t. c. q. lb. 12 1 0 0	t. c. q. lb. 14 0 1 24	—	—	—	—	—	—	—	—	—	—	—	t. c. q. lb. 3 17 0 11	—
Angle of elevation . deg.	35°	30°	—	—	—	—	—	—	—	—	—	—	—	70°	—
Angle of depression . deg.	10°	7°	—	—	—	—	—	—	—	—	—	—	—	5°	—
Weight of shield	t. c. q. lb. 3 4 0 0	t. c. q. lb. 5 5 1 15	—	—	—	—	—	—	—	—	—	—	—	t. c. q. lb. 1 19 1 14	—
Thickness of shield	·625 and ·375	3 to 1·2	—	—	—	—	—	—	—	—	—	—	—	1·9 and ·5	—

The above guns are of all-steel construction. Guns of steel and wire construction are manufactured having approximately the same characteristics.

Vickers' Howitzers and Field Guns.

	75-mm. 2·953-in. Field. 28 cals.	84-mm. 3·3-in. Field. 28 cals.	90-mm. 3·543-in. Field. 29 cals.	10·5-cm. 4·134-in. Howr. 20 cals.	10·5-cm. 4·134-in. Field. 28 cals.	10·5-cm. 4·134-in. Field. 45 cals.	5-in. Field. 41 cals.	15-cm. 5·9-in. Howr. 21·5 cals.	20·3-cm. 8-in. Howr. 14 cals.	9·2-in. Siege Howr. 17·2 cals.	12-in. Siege Howr. 17·3 cals.
Construction	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore . ins.	2·953	3·3	3·543	4·134	4·134	4·134	5	5·906	8	9·2	12
Length of bore . ins.	82·68	92·735	102·75	82·68	115·75	186·03	205	127	112	159·16	207·6
Length of gun . ins.	86·48	96·96	108·2	88·48	121·95	192·53	212·25	135·15	122·1	170·5	222·3
	c. q.	c. q.	c. q.	c. q.	c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.
Weight of gun	7 0	9 1	9 3	9 1	17 2	1 13 0	2 11 2	1 19 2	2 18 0	4 5 2	9 2 2
Weight of projectile . lb.	14·33	18·5	22·05	30·9	30·9	35·27	56	90·4	220·5	290	750
Muzzle velocity . f.s.	1,920	2,100	2,100	1,560	2,000	2,740	2,700	1,790	1,476	1,520	1,520
Muzzle energy . f.t.	366	565	675	521	856	1,840	2,831	2,010	3,330	4,645	12,015
Rounds per minute	24	24	12	10	10	8	6	4	2	2	1
	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.	t. c. q.
Weight of mounting complete with shield	18 0 0	20 3 0	23 1 0	22 0 6	38 2 0	2 15 2	4 10 0	2 16 2	5 3 0	11 15 0	28 7 2
Weight of shield	1 3 14	1 3 26	2 0 16	1 2 0	3 0 0	3 2	—	—	—	—	—
Thickness of shield . ins.	·125	·125	·128	·144	·144	4 mm.	—	—	—	—	—
Angle of elevation . deg.	40°	40°	40°	45°	40°	43°	50°	42°	60°	50°	65°
Angle of depression . deg.	5°	5°	5°	5°	5°	0°	5°	0°	0°	0°	0°

	Tank Guns.			Mountain Howitzers.		Landing.
	57-mm. 6-pdr. Semi-Auto. 27 cals.	47-mm. 3-pdr. Semi-Auto. 35 cals.	40-mm. 2-pdr. Semi-Auto. 37 cals.	75-mm. 2·953-in. Jointed. 17 cals.	105-mm. 4·134-in. Jointed. 11 cals.	76·2 mm. 3-in. 22 cals.
Construction	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore . ins.	2·244	1·85	1·575	2·953	4·134	3
Length of bore . ins.	60·6	64·75	58·27	50·2	45·474	66
Length of gun . ins.	64	68·15	60·47	53·6	51·274	70·34
	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.
Weight of gun	2 2 14	2 2 0	1 2 0	3 1 0	5 1 14	3 3 4
Weight of projectile . lb.	6	3·3	2	14·33	26·45	12·5
Muzzle velocity . f.s.	1,200	1,854	2,000	1,312	1,200	1,640
Muzzle energy . f.t.	60	79	55·5	171	264	233
Rounds per minute	—	—	—	18	10	25
	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.
Weight of mounting complete with shield	2 2 0	2 2 0	—	11 3 16	11 2 14	9 2 0
Weight of shield	—	—	—	1 0 12	1 1 10	1 1 15
Thickness of shield . ins.	—	—	—	·144	·144	·192
Angle of elevation . deg.	30°	30°	—	50°	40°	23°
Angle of depression . deg.	10°	10°	—	10°	0°	10°

Guns Mounted on Aircraft.

	·303 Auto. Observer's Gun. 79·2 cal.	·303-in. Auto. Pilot's Gun. 93·7 cal.	·5-in. Auto. Pilot's Gun. 60 cal.	1-in. Auto. 30 cal.	37-mm. 1-pdr. Auto. 22 cal.	40-mm. 2-pdr. Auto. 40 cal.	40 mm. 2-pdr. Semi-Auto. 40 cal.	57-mm. 6-pdr. Q.-F. 25 cal.
Construction	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore . . . ins.	·303	·303	·5	1	1·457	1·575	1·575	2·244
Length of bore . . . ins.	24	28·4	30	30	32·05	62	63	56·1
Length of gun . . . ins.	39	41·3	45	55	59·7	108	65·25	59·5
Weight of gun . . . lb.	22	30	52	110	150	400	234	284
Weight of projectile . . lb.	174 grs.	174 grs.	550 grs.	·441	1	2	2	6
Muzzle velocity . . . f.s.	2,300	2,400	2,550	1,542	1,200	2,000	2,300	1,200
Muzzle energy . . . f.t.	·9	1	3·5	7·25	10	55·5	73	60
Rounds per minute	500 to 600	500 to 1,000	400 to 600	150	150	100	—	—
Weight of mounting . . lb.	—	—	—	60	142	400	432	185
Angle of elevation . . deg.	—	—	—	40°	60°	71·5°	60°	60°
Angle of depression . . deg.	—	—	—	90°	60°	20°	30°	90°

Anti-Aircraft Guns.

	·303-in. Auto. 93·7 cal.	·5-inch Auto. 90 cal.	1-in. Auto 40 cal.	37-mm. 1·5-pdr. Auto. 42·5 cal.	40-mm. 2-pdr. Auto. 40 cal.	47-mm. 3-pdr. Semi-Auto. 50 cal.	3-in. Q.-F. 45 cal.	3-in. Semi-Auto. 50 cal.	3·3-in. Q.F. 50 cal.	4-in. Semi-Auto. 45 cal.	4 in. Semi-Auto. 50 cal.	4·7-in. Semi-Auto. 40 cal.
Construction	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore . ins.	·303	·5	1	1·457	1·575	1·85	3	3	3·3	4	4	4·724
Length of bore . ins.	28·4	45	40	62	62	92·5	135	150	165	180	200	188·96
Length of gun . ins.	43	66·75	64·1	94	95·7	98·9	143·1	157·6	170·3	187·8	208	197
Weight of gun	32 lb.	80 lb.	187 lb.	490 lb.	616 lb.	6 cwt.	c. q. 18 1	t. c. q. 1 2 0	t. c. q. 1 10 0	t. c. q. 1 18 3	t. c. q. 2 0 0	t. c. q. 3 1 1
Weight of projectile . lb.	174 grs.	665 grs.	·551 lb.	1·5	2	3·3	12·5	12·5	21	31	31	48·5
Muzzle velocity . . f.s.	2,400	3,000	2,000	2,100	2,000	2,800	2,600	2,789	2,500	2,700	2,850	2,559
Muzzle energy . . f.t.	1	5·92	15·5	46	55·5	180	586	675	910	1,565	1,740	2,200
Rounds per minute	500–600	400	250	200	200	30	25	25	20	18	15	9
Weight of mounting lb.	38 lb.	120	379	800	1,120	c. q. lb. 18 3 0	t. c. q. 1 19 3	t. c. q. 2 7 3	t. c. q. lb. 4 8 3 23	t. c. q. 6 14 0	t. c. q. 6 2 0	t. c. q. 8 15 2
Angle of elevation deg.	80°	90°	80°	80°	80°	80°	90°	90°	85°	90°	90°	90°
Angle of depression deg.	20°	5°	10°	10°	5°	5°	5°	5°	0°	5°	5°	5°

INFANTRY GUNS.

		44–60 mm.			47 mm.		
		44 mm. Barrel.		60 mm. Barrel.	Armour-Piercing Ammunition.		High-Explosive Ammunition.
		30 cal.		20 cal.		20 cal.	
Construction		Steel		Steel		Steel	
Diameter of bore	ins.	1·73		2·36		1·85	
Length of bore	ins.	52		47·24		37	
Length of gun	ins.	55·5		50·74		40·5	
Weight of gun		Barrel. 75 lb.	Breech ring. 50 lb..	Breech mechanism. 26 lb.	Barrel. 78 lb.	Breech ring. 55 lb.	Breech mechanism. 31 lb.
Weight of projectile	lb.	2·75		5·5	3·3		3·3
Muzzle velocity	f.s.	1,706		656	1,600		656
Muzzle energy	f.t.	55·5		17·9	58·6		9·85
Weight of mounting complete with shield			326 lb.			346 lb.	
Weight of shield			—			45 lb.	
Thickness of shield			—			3·5 mm.	
Angle of elevation	deg.	44 mm. barrel 10°		60 mm. barrel. 45° to 60°	Low position. 15°		High position. 9° to 45°
Angle of depression	deg.	5°		0°	6°		0°

ELSWICK B.L. AND Q.F. GUNS.

This Table is supplied by the Manufacturers.

	Automatic Aircraft or Naval.					Semi-Automatic.			Semi-Automatic.	Non-recoil.		Naval Landing.	Anti-Air-craft.	Anti-Air-craft.	Semi-Automatic.	Jointed Gun.		Semi-Automatic.		
Diameter of Bore ....ins.	0·5	1·457	1·457	0·9	1·85	1·85	1·85	2·24	2·24	2·24	2·953	3	3*	3	3	3	4	4	4·7	4·7
do. do. ....mm.	12 7	37	37	22·86	47	47	47	57	57	57	75	76	76	76	76	76	102	102	120	120
Length of Bore ....cals.	..	45	40	66	40	46	50	40	50	27	14·13	18·8	28	50	50	19·2	50	40	45	50
	lb.	lb.	lb.	lb.	cwts.	cwts.	cwts.	cwts.	cwts.	lbs.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.
Weight of Gun	82	340	230	230	4·51	5·0	7·5	7·5	10·5	329	1·875	4	8	19	23	4·5	42	27	53	66
do. do. ....kilos.	37·2	154	104	104	230	254	381	381	533	149	95	203	406	978	1168	229	2134	1360	2692	3353
do. Projectile ....lbs.	0·115	1·5	1·5	6 oz.	3·3	3·3	3·3	6	6	6	11·75	12·5	12·5	12·5	14·33	14·33	31	31	45	45
do. do. ......kilos.	0·052	0·681	0·681	0·17	1·5	1·5	1·5	2·722	2·722	2·72	5·33	5·67	5·67	5·67	6·5	6·5	14·06	14 06	20·41	20·41
	oz.	oz.	oz.	oz.	oz.	oz.	lb. oz.	oz.	lb. oz.	oz	oz.	oz.	lb.	lb. oz.	lb.	oz.	lb.	lb.	lb. oz.	lb.
do. Charge, M.D. Cordite	0·549	2¼	2¼	1¼	8·25	10·0	1 0	10	1 2 5	7¼	7·75	15	1·1	3 2¼	5·75	15	10·5	5·0	9 11	14
do. do. do. kilos.	..	0·071	0·071	0·042	0·234	0·283	0·453	0·283	0·525	0·22	0·22	0·369	0·5	1·43	2·608	0·425	4·76	2·27	4·395	6·35
Muzzle Velocity ....f.s.	2580	2035	2000	2800	2132	2300	2680	1968	2400	1000	1100	1585	1640	2700	3050	1485	3000	2300	2600	3000
do. do. ......m.s.	786	620	609	853	650	701	817	600	731	305	335	483	500	823	930	452	914	701	792	914
Muzzle Energy ....f.t.	5·3	43	41·6	20·4	104	121	164	161	240	41·6	98	213	233	632	922	218	1934	1137	2109	2808
do. do. ....m.t.	1·64	13·3	12·8	6·3	32·2	37·5	50·8	49·8	74·3	12·8	30·3	66	72	196	285·5	67·5	599	352	653	869·6
Penetration at Muzzle ...ins. (Tressider Wrought Iron Pl.)	2·2	3·5	3·4	3·6	5·15	5·8	7·3	5·4	7·3	1·95	..	..	5·1	10·8	13·7	..	17·4	11·6	15·6	19·3
do. do. ...mm.	55·8	88·9	86·3	91·4	130·8	147·3	185·4	137·2	185·4	49·5	..	..	129·5	274	348·0	..	442·0	294·6	396·2	490·2
Rounds per Minute	500	70	70	80	25	30	30	25	30	..	20	20	20	20	25	15	12	20	12	12

Diameter of Bore ....ins.	5	5·5	6	6	7·5	7·5	8	8	9·2	9·2	10	10	12†	12†	13·5	14†	15	15	16	18
do. do. ....mm.	127·2	139·7	152	152	190	190	203	203	234	234	254	254	305	305	343	355·6	381	381	406	457
Length of Bore ....cals.	45	50	45	50	45	50	45	50	45	50	45	50	45	50	45	45	40	45	45	40
	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons
Weight of Gun	4·05	5·65	8·4	8·75	13·8	15 75	18·0	20·4	26·75	28 82	36 25	38·25	59·3	66·7	76	85	85	98·6	108	152
do. do. ....kilos.	4114	5740	8535	8890	14021	16003	18289	20727	27179	29289	36832	38864	60252	67770	77216	86364	86364	96118	109728	154440
do. Projectile ....lbs.	60	83	100	100	200	200	250	250	380	380	500	500	850	850	1250	1400	1920	1925	2130	3320
do. do. ......kilos.	27 2	37·6	45·36	45·36	90·72	90·72	113·4	113·4	172·37	172·37	226·8	226·8	385·55	385·55	567	635	871	873·2	966	1506
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
do. Charge, M.D. Cordite	16	25·0	31	33·0	74	76	80	90	122	136	167	200	260	285	296	324	380	400	580	690
do. do. do. kilos.	7·25	11·34	14·061	15·0	33 566	34·473	36 29	40·82	55·34	61·7	75·75	90·72	117·93	129·3	134·26	147	172·3	181	263	313
Muzzle Velocity ....f.s.	2700	2900	2800	3000	2900	3000	2845	3000	2750	3000	2800	3000	2800	3000	2700	2700	2362	2500	2630	2400
do. do. ....m.s.	823	884	853	914	884	914	867	914	838	914	853	914	853	914	823	823	720	762	801·6	731
Muzzle Energy ....f.t.	3032	4840	5436	6240	11663	12481	14031	15600	19926	23714	27181	31203	46208	53046	63187	70770	74275	83125	102160	132600
do. do. ....m.t.	939	1499	1683·4	1932	3611·9	3865·2	4345·2	4831·2	6171	7340	8418	9663	14310	16428	19568	21916	23002	25835	31670	41065
Penetration at Muzzle ...ins. (Tressider Wrought Iron Pl.)	18·4	25·8	22·9	25·5	30·6	32·3	32·2	34·9	35·2	40·1	39 7	44·1	47·3	52·5	51·3	53·2	49·1	53·7	58	60
do. do. ...mm.	724	701·0	581·6	647·7	777·2	820·4	817·9	886·4	894·1	1018·5	1008·4	1120·1	1201·4	1333·5	1362·0	1351·3	1247	1364	1473	1524
Rounds per Minute	10	10	9	9	6	6	5	5	4	4	3	3	2	2	2	2	2	2	2	2

Corrected to September, 1925.

* This gun can be arranged for anti-torpedo boat attack also.
† These guns can be used on Railway Truck Mountings.

ELSWICK LAND AND AIR SERVICE GUNS AND HOWITZERS.

Calibre ... ... ins.	0·5	0·9	1·457	1·457	1·457	1·575	1·85	2·244	2·244	2·75	2·75
do. ... ... mm.	12·7	22·8	37	37	37	40	47	57	57	70	70
Length of Bore .. calibres	..	56	..	45	..	25	..	23	20·4	26·5	..
Weight of Gun	lbs. 82	lbs. 222	lbs. 175	lbs. 412	lbs. 33	lbs. 102	lbs. 83	cwts. 5	lbs. 350	lbs. 400	lbs. 92
do. do. ... ... kilos.	37·2	101	79·4	187	15	46	37·65	254	159	182	41·7
Type of Breech Mechanism	Auto	Auto Block	Auto	Auto Block	Block	Semi-Auto	Block	Semi-Auto	Revolver Type	Screw	Block
System of Obturation ...	Cart.	C. Case	C. Case	C. Case	C. Case	C. Case	C. Case	C. Case	Bare Charges	De Bange	C. Case
Muzzle Velocity ft.-secs.	2580	2800	2300	2000	1400	1474	1200	1580	1000	1200	850
do. metre-secs.	786	853	701	610	427	449	366	481	304	365	259
Weight of Projectile ... lbs.	0·115	6 ozs.	1·25	1½	1·5	2	3·3	6	6	12·5	10
do. do. ... kilos.	0·054	0·17	0·567	0·68	0·68	0·91	1·5	2·72	2·72	5·67	4·53
Rounds per Minute	500	90	350	80	20	30	20	25	25	25	15
Type of Mounting ...	Tripod	Air Service or Tanks	Aircraft, Tanks, Infantry	Air Service Automatic	Infantry Gun	Tank	Infantry Gun	Tank	Two-Barrelled Aeroplane Guns Non-recoil	Mountain Gun Jointed on Field Carriage	Infantry Gun Field & French Howitzer
Weight of Carriage or Mounting ... ... kilos.	70 lbs.	To Suit Aircraft	120 lbs.	To Suit Aircraft	6 loads 33 lbs. each 15	cwt. 3½ 178	10 loads	cwt. 7 355	lbs. 24 11	cwt. 8 406	9 loads max. 100 lbs. 45
Maximum Elevation	75°		80°		15°	20°	75°	20°	40°	15°	65°
„ Depression ...	35°		35°		0°	15°	0°	15°	40°	15°	0°

Calibre ... ... ins.	2·78	2·953	3	3	3	3	3	3	5·3	3·3
do. ... ... mm.	70·6	75	76·2	76·2	76·2	76·2	76·2	76·2	83·81	83·8
Length of Bore .. calibres	..	15·2	30	31	28	23	45	23	36·37	28
Weight of Gun	lbs. 280	lbs. 260	cwts. 9·5	cwts. 9·25	cwts. 7·25	cwts. 6	cwts. 15	cwts. 5·25	cwts. 9·6	cwts. 9
do. do. ... ... kilos.	127	118	482	469	368	305	762	266	482	456
Type of Breech Mechanism	Screw	Screw	Block	Screw	Block	Block	Block	Screw	Screw	Screw
System of Obturation ...	De Bange	C. Case	C. Case	C. Case	C. Case	C. Case	C. Case	C. Case	C. Case	C. Case
Muzzle Velocity ft.-secs.	317	1310	1725	2000	1750	1700	2600	1640	1722	1636
do. metre-secs.	96·5	399	526	609	533	518	792	500	524	498
Weight of Projectile ... lbs.	100	12·5	12·5	12·5	14·3	12·5	12·5	12·5	20·5	18·5
do. do. ... kilos.	45·36	5·67	5·67	5·67	6·48	5·67	5·6	5·67	9·25	8·39
Rounds per Minute	..	25	20	20	20	20	20	20	20	20
Type of Mounting ...	Trench Stick Bomb Thrower	Mountain Gun Diff-recoil	Submarine	Anti-aircraft on Motor Lorry	Field	Horse and Field	Anti-aircraft	Naval Landing	Field	Field
Weight of Carriage or Mounting ... ... kilos.	cwts. 9·5 843	cwt. 7 358	tons 1·22 1232	tons 1·2 1220	cwt. 15 765	cwts. 13¼ 673	tons 1·85 1867	cwt. 9·75 500	cwt. 19·25 977	cwt. 17 864
Maximum Elevation	45°–70°	40°	75°	80°	16°	16°	90°	16°	40°	16°
„ Depression ...	0°	10°	5°	0°	5°	5°	10°		5°	5°

Calibre ... ... ins.	4	4·5	4·7	5	6	6	6	8
do. ... ... mm.	101·6	114·3	120	127	152	152	152	203
Length of Bore... calibres	45	20	12·0	8·4	45	12·2	50	15
Weight of Gun...	tons 2·25	cwts. 14·75	cwts. 8	tons 2	tons 7·45	ton 1	tons 8·7	tons 2·9
do. do. ... ... kilos.	2300	748	397	2032	7525	1016	8840	2946
Type of Breech Mechanism	Screw	Screw	Block	Screw	Screw	Block	Screw	Screw
System of Obturation ...	C. Case	De Bange	C. Case	De Bange	De Bange	C. Case	De Bange	De Bange
Muzzle Velocity ft.-secs.	2600	1450	1156	2150	2800	1000	3000	1200
do. metre-secs.	792	442	350	655	854	305	914	396
Weight of Projectile ... lbs.	31	35	35	60	100	100	100	200
do. do. ... kilos.	14·06	15·87	15·87	27·21	45·4	45·36	45·36	90·72
Rounds per Minute	15	12	15	10	8	9	7	6
Type of Mounting ...	Anti-Aircraft	Field Howitzer	Field Howitzer	Position Gun Field Carriage	Field Carriage	Howitzer	Railway Truck	Howitzer Railway Truck
Weight of Carriage or Mounting ... ... kilos.	tons 4·55 4648	cwts. 19·2 984	cwts. 17·3 882	tons 3·25 3300	tons 5·5 5605	.. ..	tons 10 10160	tons 24·6 25000
Maximum Elevation... ...	90°	50°	50°	20°	20°	..	40°	45°
„ Depression ...	10°	5°	5°	5°	5°	..	0°	0°

Calibre ... ... ins.	9·2	9·2	9·45	11	12	12	14	18
do. ... ... mm.	234	234	240	279·4	305	305	355·6	457·2
Length of Bore... calibres	13·2	35	..	5·3	17	17·3	45	34·7
Weight of Gun...	tons 3·4	tons 24·2	cwts. 11·25	cwts. 13·2	tons 12·55	tons 11·25	tons 83·25	tons 85·7
do. do. ... ... kilos.	3454	22774	553	670	12751	11430	84585	87075
Type of Breech Mechanism	Screw	Screw	Screw	Screw	Screw	Screw	Screw	Screw
System of Obturation ...	De Bange	De Bange	C. Case	De Bange	De Bange	De Bange	De Bange	De Bange
Muzzle Velocity ft.-secs.	1190	2300	444	400	1350	1450	2500	1900
do. metre-secs.	362	701	135	122	4115	442	762	579
Weight of Projectile ... lbs.	290	380	170	200	981	750	1586	2500
do. do. ... kilos.	131·54	172·36	77·11	96·72	445	340·2	719·4	1134
Rounds per Minute	4	4	..	3	2	2	2	2
Type of Mounting ...	Howitzer Field Carriage	Railway Truck	Trench Bomb Thrower	Trench Mortar	Howitzer Land Service	Howitzer Railway Truck	Railway Truck	Howitzer Railway Truck
Weight of Carriage or Mounting ... ... kilos.	tons 5·35 5435	tons 65·5 66550	tons 3·9 3960	tons 2·8 2845	tons 39·75 40100	tons 49·5 50300	tons 163·75 166380	tons 163·75 166380
Maximum Elevation... ...	45°	40°	20°–45°	45°–80°	65°	65°	40°	..
„ Depression ...	0°	0°	0°	0°	8°	2°	0°	..

Corrected to September, 1925.

ELSWICK "ALL STEEL" GUNS.

This Table is supplied by the Manufacturers.

Calibre ... ... ins.	1·457	1·85	2·75	3	3·3	4·5	5·87	6	6	8	8	14	16	16
do. ... . m.m.	37	47	69·85	76·2	83·8	114·3	149·1	152·4	152·4	203·2	203·2	355·59	406·4	406·4
Length of Bore ... calibres	25	20	12	45	33	20	8·47	45	50	50	50	45	45	50
	lbs.	lbs.	lbs.	cwts.	cwts.	cwts.	cwts.	tons	tons	tons	tons	tons	tons	tons
Weight of Gun	41	83	112	13½	8¼	10	7	5	5·47	13·15	15·3	62	83	103½
do. ... ... kilos.	18·6	37·65	50·8	673	432	508	356	5080	5563	13,360	15,543	62,995	84,332	105,161
Type of Breech Mechanism ...	Block	Block	Block	Block	Screw	Screw	Block	Screw	Screw	Block	Screw	Screw	Screw	Screw
System of Obturation	C. Case	C Case	C. Case	C. Case	C. Case	De Bange or C. Case	C. Case	De Bange	De Bange	C. Case	De Bange	De Bange	De Bange	De Bange
Muzzle Velocity ... feet-secs.	1400	1200	850	2600	1750	1400	750	2800	3000	2900	2940	2500	2700	2953
do. ... metre-secs.	427	366	259	792·5	533	427	228	853	914	884	896	762	823	900
Weight of Projectile ... ... lbs.	1·5	3·3	10	12·5	20·5	35	70	100	100	253·5	256	1586	2130	2130
do. ... ... kilos.	0·68	1·5	4·54	5·67	9·3	15·87	31·75	45·36	45·36	115	116	719·4	966·1	966·1
Rounds per Minute	25	25	20	20	20	12	10	9	9	5	4	2	2	2
Type of Mounting	Infantry Field Carriage	Infantry Field Carriage, and Trench Howitzer	Infantry Field Carriage, and Trench Howitzer	Anti-Air-craft	Field Carriage	Field Carriage	Trench Mortar	Upper Deck with Shield Open at Rear		Upper Deck with Totally Enclosed Gun House		Railway Truck Mounting		
Weight of Carriage or Mounting ... ... kilos.	155 lbs. 70·3	lbs. 500 kilos 226·8	lbs. 584 kilos. 248·6	cwts. 29·75 1511	cwts. 20 1016	cwts. 20 1016	With base for Concrete: 2 ton 2032; Earth: 2·8 ton 2845	tons 15·6 15,850	tons 15·6 15,850	tons 67 68,076	tons 67 69,076	tons 163·75 166,380		
Maximum Elevation...	15°	As Field Gun 75°; As Trench How. 35° min. 56° max.	As Field How. 10° min. 65° max.; As Trench How. 25° min. 55° max.	85°	40°	70°	60°	35°	35°	60°	60°	40°		
" Depression	5°	5°; 0°	0°; 0°	5°	5°	10°	0°	10°	10°	5°	5°	0°		

Corrected to September, 1925.

BEARDMORE GUNS AND HOWITZERS.

This Table is supplied by the Manufacturers.

(September, 1925.)

Calibre.		Length of Bore.	Weight.		Projectile.		Muzzle Velocity.		Remarks.
Ins.	mm.	Calibres.	Tons.	Cwts.	Lbs.	Kilos.	ft.-secs.	m.-secs.	
16	406	45	107	0	2100	952·5	2675	815·3	
15	381	45	96	0	1850	839·2	2620	798·6	
13·5	343	46	77	0	1350	612·4	2650	807·7	
12	304	50	66	0	950	430·9	2825	861	
9·2	234	50	29	0	425	192·8	2825	861	
9·2	234	17	4	5	290	131·5	1500	457·2	Howitzer.
8	203	55	18	5	252	114·3	3000	914·4	
8	203	50	17	10	252	114·3	2900	883·9	
8	203	17	3	0	200	90·72	1500	457·2	Howitzer (a).
7·5	190	45	13	18	200	90·72	2750	838·2	
6	152	55	8	7	100	45·36	3025	922	
6	152	50	7	18	100	45·36	2950	899·1	
6	152	35	3	14	100	45·36	2375	723·9	Field Gun (a).
6	152	13	1	6	100	45·36	1250	381	Howitzer.
5·5	140	55	5	18	82	37·2	3000	914·4	
5·5	140	50	5	10	82	37·2	2900	883·9	
4·724	120	45	3	4	45	20·4	2750	838·2	
4·724	120	20	0	8·7	36	16·33	1200	366	Howitzer (b).
4·0	102	55	2	9	31	14·06	3000	914·4	
4·0	102	55	2	9	25	11·34	3200	975·3	Anti-Aircraft.
4·0	102	50	2	8	31	14·06	2920	890	
			Cwts.	Kilos.					
3·3	84	31	8·6	437	18·5	8·39	1750	533·4	Field Gun (b).
3·0	76	55	22·5	1142	15·0 12·5	6·8 5·67	2750 3000	938·4 914·4	Anti-Aircraft (Fixed).
2·95	75	44	13·0	660	15·0	6·8	2150	655·4	Anti-Aircraft (Mobile).
2·24	57	23	5·6	284	6	2·72	1525	464·8	Tank Gun.
1·85	47	30	1·8	90·7	3·25	1·49	1750	533·4	Tank Gun.
1·85	47	28·5	0·92	46·7	3·25	1·49	1550	472·7	Light Field Gun.
1·57	40	37	0·92	46·7	2·0	0·91	1900	579	Light Field Gun (c).
2·24	57	24	0·92	46·7	6·0	2·72	700	213·4	Light Howitzer (c).

(a) (a)
(b) (b) } Alternatives to suit the same Field Carriage.
(c) (c)

BRITISH NAVAL ORDNANCE.

GUN. Calibre. Inches.	MARK.	Length in Calibres.	Weight of Gun. tons.	Weight of Projectile. lbs.	Weight of Charge. lbs.	Muzzle Velocity. ft./sec.	Muzzle Energy. tons/ft.	CARRIED BY
16	..	..	..	..	..	..	..	Nelson and Rodney
15	I.	42	96	1920	428	1920	84,070	Royal Sovereign, Queen Elizabeth, Hood, and Repulse Classes
13·5	V.	45	75	1400	296	2700	63,190	King George, Iron Duke, and Tiger Classes
7·5	Semi-Automatic	50	15·7	..	..	..	..	Hawkins Class
6	XI.	50	8·5	100	32	3000	6,240	Royal Sovereign, Queen Elizabeth, Tiger
6	VII. VIII.	45	7·4	100	23	2750	5,250	Iron Duke Class
5·5	I.	50	6·3	82	22¼	2725	4,520	Hood

FRENCH NAVAL ORDNANCE.

Date and Pattern of Gun.	Model 1912. (1)	Model 1906–10. (2)	Model 1906. (3)	Model 1902–06. (4)	Model 1902. (5)	Model 1893–96. (6)	Model 1893–96. (7)	Model 1893–96. (8)	Model 1910. (9)	Carried by
Desig. by Calibre, in cms.	34	30·5	30·5	24	19·4	19 4	16·4	16·4	14	(1) Bretagne Class
Calibre, in inches	13·4	12·01	12·01	9·4	7·6	7·6	6·5	6 5	5·5	(2) Jean Bart Class
Total length, in feet	..	..	..	..	..	..	..	..	..	(3) } Voltaire Class
Length of Bore, in ins.	..	..	..	..	..	..	..	..	..	(4) }
Length, in cals.	45	45	45	50	50	45	45	45	55	(5) Edgar Quinet Renan
Total weight, in tons	66	55	47	29·2	15	12·6	7·95	7·95	5·2	Michelet
Weight of Firing Charge, Armour-piercing Projectile . . lb.	331	282	284	148	84	74·5	45·6	43·7	22·7	(6) Jules Ferry Class
Weight { Armour-piercing Projectile lb.	1190	924	960	487	199	199	121	121	80·5	(7) Renan Class
Weight { Common Shell ,,	..	..	..	..	..	..	..	..	..	(8) Jules Ferry Class
Muzzle Velocity, in f.-s., A.P. Projectile	2625	2560	2560	2625	3117	2789	2953	2838	2723	(9) Bretagne Class Jean Bart Class
Muzzle Energy in foot-tons	57,200	42,300	44,000	23,500	13,450	10,800	7360	6800	4180	
Perforation at Muzzle,† wrought iron, inches	48·0	43·2	44·8	36·75	33·8	28·6	26·3	24·8	20·6	
Perforation Krupp Steel, 3000 yds. inches	11·8 (9000 metres)	13·8 6000 metres	..	6·32 9000 metres	..	..	..	..	..	

† By Tressider's formula.

In the new cruisers a 15-cm. gun of a new pattern is to be mounted.

UNITED STATES NAVAL ORDNANCE.

GUN.	MARK.	Length in Calibres.	Total Length	Capacity of Chamber in Cubic Inches.	Travel of Projectile in Inches.	Weight of Gun.	Weight of Projectile.	Weight of Charge.	Muzzle Velocity.	Muzzle Energy.	Penetration at Muzzle, Krupp Armour, using Capped Projectile.	At 3000 Yards. Remaining Velocity.	At 3000 Yards. Penetration.	At 6000 Yards. Remaining Velocity.	At 6000 Yards. Penetration.	At 9000 Yards. Remaining Velocity.	At 9000 Yards. Penetration.
			inch.			tons.	lb.	lb.	ft.-seconds.	ft.-tons.	inch.	ft.-seconds.	inch.	ft.-seconds.	inch.	ft.-seconds.	inch.
3-in. S.A.	V., VI.†	50	159	219	128·3	1·0	13	3·85	2700	658	3·3	1230	1·2	848	0·8	..	..
4-in. R.F.G.	III., IV., V., VI.	40	164	331	134·5	1·5	33	4·85	2000	915	3·4	1156	1·7	897	1·2	..	..
4-in. R.F.G.	VII.	50	205	652	168·3	2·6	33	9·0	2500	1,430	4·6	1432	2·2	979	1·4	853	1·2
4-in. R.F.G.	VIII.‡	50	205	652	168·3	2·9	33	12·3	2800	1,794	5·3	1627	2·6	1033	1·5	878	1·2
5-in. R.F.G.	II., III., IV.	40	206	656	167·8	3·1	50	10·0	2300	1,845	5·3	1286	2·6	934	1·7	829	1·4
5-in. B.L.R.	V., VI.	50	256	1,200	215·6	4·6	60	19·2	2700	3,032	6·2	1692	3·5	1102	2·0	928	1·6
5-in. B.L.R.	VI.	50	256	1,200	215·6	4·6	50[1]	20·5	3000	3,122	6·4	1732	3·2	1057	1·7	877	1·4
5-in. R.F.G.	VII.§	51	261	1,135	215·6	5·0	50	23·8	3150	3,439	6·8	1835	3·4	1091	1·8	895	1·4
6-in. R.F.G.	II., III.	30	196	1,318	145·4	4·8	105	18·8	1950	2,768	5·3	1305	3·2	1009	2·3	909	2·0
6-in. R.F.G.	IV., VII.	40	256	1,320	205·8	6·0	105	18·8	2150	3,365	6·0	1440	3·6	1058	2·4	934	2·1
6-in. R.F.G.	IX.	45	270	1,320	221·7	7·0	105	18·8	2250	3,685	6·3	1511	3·8	1086	2·5	948	2·1
6-in. B.L.R.	VI.	50	300	2,101	247·5	8·3	105	30·0	2600	4,920	8·0	1770	4·7	1207	2·9	996	2·2
6-in. B.L.R.	VIII.	50	300	2,101	247·5	8·6	105	37·0	2800	5,707	8·3	1923	5·2	1297	3·2	1026	2·3
7-in. B.L.R.	II.	45	323	3,643	259·8	12·7	165	58·0	2700	8,338	9·6	1948	6·4	1382	4·2	1083	3·0
8-in. B.L.R.	III., IV.	35	305	3,170	245·8	13·1	260	43·8	2100	7,948	8·6	1576	6·0	1206	4·2	1040	3·6
8-in. B.L.R.	V.	40	343	5,243	273·1	18·1	260	78·0	2500	11,264	10·6	1898	7·5	1428	5·3	1141	4·0
8-in. B.L.R.	VI.	45	369	5,243	299·1	18·7	260	98·5	2750	13,360	12·0	2106	8·6	1589	6·1	1227	4·4
10-in. B.L.R.	I., II.	30	329	6,779	251·1	25·1	510	90·0	2000	14,141	10·7	1590	8·0	1274	6·1	1103	5·0
10-in. B.L.R.	III.	40	413	10,222	327·0	34·6	510	207·5	2700	25,772	15·6	2184	11·9	1747	9·0	1406	6·9
12-in. B.L.R.	I., II.	35	441	11,991	345·2	45·3	870	160·0	2100	26,596	14·2	1733	11·2	1433	8·8	1219	7·2
12-in. B.L.R.	III., IV.	40	493	17,096	392·2	52·1	870	237·5	2400	34,738	16·8	1994	13·3	1649	10·5	1376	8·3
12-in. B.L.R.	III., IV.	40	493	17,096	392·2	52·1	870	305·0	2600	40,768	18·5	2171	14·8	1801	11·7	1500	9·3
12-in. B.L.R.	V.	45	553	16,974	452·0	52·9	870	305·0	2700	43,964	19·4	2259	15·5	1877	12·3	1561	9·8
12-in. B.L.R.	VI.	45	553	14,970	452·0	53·6	870	340·0	2850	48,984	20·8	2393	16·6	1991	13·3	1653	10·6
12-in. B.L.R.	VII.	50	607	14,296	506·3	56·1	870	340·0	2950	52,483	21·7	2483	17·5	2071	13·9	1719	11·0
13-in. B.L.R.	I., II.	35	479	15,068	374·9	61·4	1130	180·0	2000	31,333	15·0	1679	12·0	1414	9·7	1221	8·1
14-in. B.L.R.	I.[1]	45	642	..	..	63·6	1400	365·0	2600	65,606	39·7*	..	23·4*	..	..	..	18·0
14-in. B.L.R.	II.[2]	50	700	..	..	82·2	1400	..	2800	76,180	44·1	..	27·4	..	..	..	..
16-in. B.L.R.	..	45	..	..	..	105·0	2100		2800	98,500	45·95	..	..	..	..	..	..
16-in. B.L.R.	.	50	..	..	..	130·0	2100		2800	114,270	51·08	..		..	..	..	..

* De Marre formula.

[1] Pennsylvania class.

[2] New Mexico class.

† A short anti-aircraft 3-in. gun is mounted in many of the ships.

‡ There is now a 4-in. 50-cal. anti-aircraft gun.

§ All battleships from the Delaware class onward have this gun for torpedo defence.

Corrected to 1923.

ITALIAN NAVAL ORDNANCE.

Date and Pattern of Gun.	381/40 A. V. 1914 (1)	305/46 A. V. 1909 (2)	305/40 A. 1900–4 (3)	254/45 A. 1907 (4)	254/45 V. 1906 (5)	203/45 A. 1897 (6)	190/45 A. V. 1906–8 (7)	152/45 1911 (8)	120/50 A. V. 1909 (9)	120/45 A. 1913–18 (10)	102/45 A. 1917 (11)	Carried by
Desig. by Calibre, in cms.	38·1	30·5	30·5	25·4	25·4	20·3	19	15·2	12	12	10·2	(1) Monitors
Calibre, in inches	15	12	12	10	10	8	7·5	6	4·75	4·75	4	(2) Duilio Class Cavour Class Dante Alighieri
Total length, in feet	51·67	47·77	41·707	39·07	38·715	31·126	29·22	23·42	20·38	18·38	15·715	
Length of Bore, in inches	511·7	477·9	383·42	358·4	370·5	308·9	281·7	219·2	204·64	174·64	150·74	(4) S. Giorgio Class
Length, in cals.	40	46	40	45	45	45	45	45	50	45	45	(5) Pisa
Total weight, in tons	83·56	63	51·77	34·5	35·84	19·6	14·48	7·03	3·66	4·1	2·33	(7) San Giorgio Class Pisa
Weight of Firing Charge, Armour-piercing Projectile . . . lb.	..	346	194	185	185	51·8	71	..	..	..	..	(8) Duilio Class Campania Libia
Weight — Armour-piercing Projectile lb.	1934	997	943	494	494	269	200	..	..	..	..	
Weight — Common Shell . . . lb.	1929	884	882	490	490	256	198·5	104	48·7	48·7	30·3	(9) Cavour Class Dante Alighieri Libia Quarto
Muzzle Velocity, in f.-s., A.P. Projectile	2297	2756	2347	2789	2789	2559	2789	2723	2788	2460	2788	
Muzzle Energy in foot-tons	71,000	52,700	36,300	26,800	26,800	12,280	10,870	5400	2650	2060	1642	
Perforation at Muzzle,† wrought iron, ins.	47·4	50	38·3	39·3	39·3	28·5	28·8	..	..	..	..	
Perforation Krupp Steel, 3000 yds.	..	9·8 9000 metres	..	..	..	..	..	..	..	..	..	

† By Tressider's Formula. A. = Armstrong. V. = Vickers.

JAPANESE NAVAL ORDNANCE

Date and Pattern of Gun.	KM. (1)	V. (2)	A. (3)	V. (4)	A. (5)	A. (6)	V. (7)	— (8)	A. (9)	Carried by
Desig. by Calibre, in cms.	40·6	35·6	20·3	15·2	15·2	15·2	15·2	14	12	(1) Mutsu Class.
Calibre, in inches	16	14	8	6	6	6	6	5·5	4·7	(2) Ise Class. Fuso Class. Kongo Class.
Total length, in feet	..	..	..	..	..	..	..	..	..	
Length of Bore, in ins.	..	..	..	..	..	..	..	..	..	(4) Kongo.
Length of Bore, in cals.	45	45	45	50	50	45	45	50	50	(5) Fuso Class. Kongo Class (except Kongo). Yahagi. Tone.
Total weight, in tons	..	83	17·3	8	8·7	8·5	7·5	6·25	3·3	
Weight of Firing Charge, Armour-piercing Projectile . . . lb.	..	..	..	..	..	..	..	..	..	(8) Ise Class. Mutsu Class. Kuma Class. Tenryu Class.
Weight { Armour-piercing Projectile lb.	2190	1400	250	100	100	100	100	82	45	
Weight { Common Shell ,,	..	..	..	..	..	..	..	..	..	
Muzzle Velocity, in f.-s., A.P. Projectile	2780	2526	2740	3000	3000	2130	3000	2725	2988	(9) Tone. Yodo. Mogani.
Muzzle Energy in foot-tons	118,000	62,500	13,100	6300	6300	3165	6300	4250	2810	
Perforation at Muzzle,† wrought iron, inches	65	48·2	30·5	25·5	25·5	18·3	25·5	20·8	19·2	
Perforation Krupp Steel, 3000 yds.	13·8 at 10,970 metres	..	10½	6½	6½	4½	6½	..	2½	

† By Tressider's Formula.

BETHLEHEM STEEL CO.

SHIP AND COAST-DEFENCE GUNS.

Table supplied by the Manufacturers, August, 1924.

Calibre.		Length of bore.	Weight of gun, including breech mechanism.		Weight of projectile.		At Muzzle. Velocity.		At Muzzle. Energy.		At Muzzle. Penetration of steel-plate (De Marre).		Type of Ammunition.
inches.	millimetres.	calibres.	lbs.	kgs.	lbs.	kgs.	ft. per sec.	metres per sec.	foot-tons.	metre-tons.	inches.	milli-metres.	
1·457	37	about {50	160	72·5	1·07	0·48	2,150	655	34	10·5	2·04	51·8	Fixed in cartridge case.
1·850	47	about {50	550	249·5	3·3	1·5	2,400	732	132	41	4·11	104·4	,, ,,
2·244	57	50	960	435·5	6·07	2·75	2,400	732	243	75	5·17	131·3	,, ,,
3	76	50	1950	884·5	13	5·9	2,700	823	658	204	7·71	195·8	,, ,,
			tons.										
4	102	50	2·6	2,642	33	15	2,800	853	1,795	557	11·61	294·9	,, ,,
4	102	50	2·6	2,642	30·86	14	3,000	914	1,928	597	12·22	310·4	,, ,,
5	127	51	5·0	5,080	50	22·7	3,150	960	3,440	1,067	14·56	369·8	Separate, with powder in bag.
6	152	45	7·0	7,112	105	47·6	2,600	792	4,926	1,523	15·47	392·9	Separate, with cartridge case.
6	152	50	8·4	8,534	105	47·6	2,800	853	5,713	1,767	17·19	436·6	Separate, with powder in bag.
6	152	53	10·1	10,260	105	47·6	3,000	914	6,559	2,028	18·97	481·8	,, ,, ,,
7	178	45	12·7	12,900	165	74·8	2,700	823	8,348	2,584	19·11	485·4	,, ,, ,,
7	178	50	14·5	14,730	165	74·8	2,900	884	9,631	2,982	21·16	537·5	,, ,, ,,
8	203	45	18·6	18,900	260	118	2,800	853	14,148	4,379	24·15	613·4	,, ,, ,,
8	203	50	22·3	22,660	260	118	2,900	884	15,177	4,703	25·38	644·6	,, ,, ,,
9·2	234	50	30·4	30,890	380	172	2,900	884	22,181	6,856	28·66	727·9	,, ,, ,,
10	254	45	35·4	35,970	515	234	2,800	853	28,023	8,685	30·97	786·6	,, ,, ,,
10	254	50	43·9	44,600	515	234	2,900	884	30,061	9,327	32·56	827·0	,, ,, ,,
12	305	45	53·8	54,660	870	395	2,800	853	47,341	14,660	37·05	941·1	,, ,, ,,
12	305	50	57·5	58,400	870	395	2,900	884	50,783	15,745	38·95	989·3	,, ,, ,,
14	356	45	64·6	65,650	1,400	635	2,600	792	65,687	20,317	39·69	1008·0	,, ,, ,,
14	356	50	79·4	80,700	1,400	635	2,800	853	76,181	23,567	44·12	1121	,, ,, ,,
15	381	45	86·5	87,880	1,700	771	2,600	792	79,763	24,668	42·35	1076	,, ,, ,,
16	406	45	105·0	106,500	2,100	953	2,600	792	98,530	30,491	45·95	1167	,, ,, ,,
16	406	50	128·0	130,200	2,100	953	2,[illegible]00	853	114,272	35,369	51·08	1297	,, ,, ,,
16	406	50	140·0	142,400	2,330	1,057	2,700	823	117,900	36,500	52·39	1331	,, ,, ,,
18	457	45	150·0	152,400	3,330	1,510	2,450	747	138,734	42,979	51·71	1313	,, ,, ,,

Guns of 4·7-in. calibre and under, equipped with the wedge-type breech mechanism, are supplied with an automatic breech-opening device, if desired.

GERMAN SHIP AND COAST GUNS.

This list of Krupp guns was corrected in September, 1921. It is preserved here as a record of the guns which were produced at Essen shortly before the war, and during its course up to the time when the provisions of the Armistice came into force. Under the Peace Treaty the delivery of German war material abroad is interdicted. The most important of the new guns were those of heavy calibres: 16 in., 18 in. and 20 in. The pre-war table showed no guns of greater length than 40 calibres below the 11 in. The Essen Company always attached the greatest importance to the endurance and performances of its heavy guns. The light cruiser Dresden, which has been laid down at Wilhelmshaven, will have 6-in. or 5·9-in. guns.

Calibre . . . . cm.	7·5 = 2·9 in.		8·8 = 3 4 in.		10·5 = 4·1 in.		15 = 5·9 in.		21 = 8·2 in.		24 = 9·4 in.		28 = 11 in.	
Length of Bore . . . . cals.	45	50	45	50	45	50	45	50	45	50	45	50	45	50
Length of Bore . . . . mm.	3375	3750	3960	4400	4725	5250	6710	7455	9420	10465	10800	12000	12600	14000
Total Length . . . ,,	3570	3945	4190	4630	5000	5525	7100	7845	9965	11010	11425	12625	13330	14730
Weight of Gun . . . . kg.	760	780	1225	1260	2095	2140	5970	6120	14600	15440	21950	23250	34900	36900
Weight of Projectile . . ,,	5·8	5·8	9·5	9·5	16	16	46	46	125	125	190	190	300	300
Weight of Charge . . . ,,	1·84	1·84	2·97	2·97	5·05	5·05	14·4	14·4	38·8	38·8	58·3	58·3	92·7	92·7
Muzzle Velocity . . . m/sec.	850	875	850	875	850	875	850	875	850	875	850	875	850	875
Muzzle Energy . . . . mt.	213·5	226·5	350	371	590	625	1694	1797	4610	4880	7000	7420	11040	11700
Muzzle Penetration (Steel) mm.	206	215	247	258	297	310	433	452	616	642	717	747	842	878

Calibre . . . . cm.	30·5 = 12 in.		35·56 = 14 in.		38·1 = 15 in.		40·64 = 16 in.		45·72 = 18 in.		50·8 = 20 in.	
Length of Bore . . . . cals.	45	50	45	50	45	50	45	50	44	50	45	50
Length of Bore . . . . mm.	13725	15250	16000	17780	17145	19050	18290	20320	20575	22860	22860	25400
Total Length . . . . ,,	14520	16045	16925	18705	18135	20040	19345	21375	21765	24050	24180	26720
Weight of Gun . . . . kg.	45100	47700	70000	75200	86100	92500	104300	112200	148300	159500	204000	219000
Weight of Projectile . . . ,,	390	390	620	620	760	760	920	920	1310	1310	1805	1805
Weight of Charge . . . ,,	120	120	190	190	233	233	284	284	402	402	553	553
Muzzle Velocity . . . . m/sec.	850	875	850	875	850	875	850	875	850	875	850	875
Muzzle Energy . . . . mt.	14350	15230	22800	24200	27950	29650	33900	35950	48250	51200	66500	70500
Muzzle Penetration (Steel) . mm.	927	967	1095	1142	1177	1227	1259	1312	1428	1488	1600	1668

No gun larger than 11-in. is now mounted.

SIZE AND FIGHTING QUALITIES OF BRITISH CAPITAL SHIPS OF DIFFERENT PERIODS.

Name.	Date of Completion.	Displacement.	Side Armour.	Speed.	Total Weight of Shot in One Round.	Collective Energy at Muzzle of One Round.
		tons.	in.	knots.	lb.	foot-tons.
Warrior	1861	9,210	4½-in. wrought-iron	14½	3,800	61,476
Hercules	1868	8,680	9-in. to 6-in. wrought-iron	14	5,400	70,200
Alexandra	1877	9,490	12-in. to 6-in. wrought-iron	15	5,426	71,400
Inflexible	1881	11,880	24-in. to 16-in. wrought-iron	13	6,936	123,120
Benbow	1888	10,600	18-in. compound	16·75	4,600	135,560
Royal Sovereign	1892	14,150	18-in. and 5-in. compound	17·5	5,800	159,610
Barfleur	1894	10,500	12-in. compound	18·5	2,450	67,670
Canopus	1900	12,950	6-in. hardened steel	18·25	4,600	178,720
Prince of Wales	1902	15,000	9-in. super-hardened steel	18·25	4,600	194,400
King Edward VII.	1905	16,350	9-in. hardened steel	19	6,100	271,800
Dreadnought	1906	17,900	11-in. hardened steel	21	8,800	487,100
Neptune	1911	20,600	12-in. hardened steel	21·5	8,900	545,000
Ajax	1913	25,000	12-in. hardened steel	21·5	14,500	625,000
Queen Elizabeth	1915	27,500	13-in. hardened steel	25	15,360	638,000
Royal Sovereign	1916	25,750	13-in. hardened steel	23	15,360	638,000
Hood	1920	41,200	13-in. hardened steel	31	15,360	638,000
Nelson	Bldg.	35,000	..	..	..	..

PARTICULARS OF SUCCESSIVE LARGE BRITISH NAVAL GUNS, 1800 TO 1921

Year.	Type	Weight.		Length.	Calibre.	Weight of Projectile.	Weight of Charge.	Muzzle Energy.	Penetration of Wrought-iron at 1000 yards range.
		tons.	cwt.	in.	in.	lb.	lb.	ft.-tons.	in.
1800	Cast-iron smooth-bore . .	2	12	114	6·4	32	10	400	—
1842	Ditto	4	15	—	8·12	68	16	700	—
1865	Woolwich wrought-iron .	4	10	—	7	115	22	1,400	7
1870	Built-up muzzle-loader . .	38	0	200	12·50	810	200	13,900	17
1880	Ditto	80	0	321	16	1700	450	27,960	22½
1887	Built-up breech-loader . .	110	10	524	16·25	1800	960	54,390	32
1895	Wire-wound breech-loader .	46	0	445·5	12	850	—	33,940	34·6
1900	Ditto	51	0	496·5	12	850	210	36,290	35·4
1905	Ditto	58	0	558	12	850	—	47,700	46·2
1912	Ditto	76	0	626	13·5	1400	—	60.600	*50
1914 to 1920	Ditto	96	0	675	15	1920	—	84.070	*56
1921	Ditto	117	0	720	16	2240	—	93,230	*57

* At muzzle. Guns of 18-in. calibre were fitted to one cruiser during the War, but were subsequently removed and used in monitors.

NAVAL REFERENCE SECTION.

THE FIRST LORD'S STATEMENT EXPLANATORY OF THE NAVY ESTIMATES, 1925–26.

THE net total of Navy Estimates for 1925–26 is £60,500,000.

In this total are included two sums of £1,320,000 and £50,000 respectively representing charges appearing for the first time in Navy Votes on account of the cost of the Fleet Air Arm and of the work done for the Navy at the (Army) Experimental Establishment, Shoeburyness.

A further net sum of about £1,500,000 (after allowing for a considerable reduction in the Annuity in repayment of advances under the Naval Works Acts) is due to uncontrollable causes such as increases in wages and prices, the automatic growth of the Non-Effective Votes, and reductions in the quantities of surplus war stores available for use without replacement, and in the expected receipts from Appropriations-in-Aid.

These items account for considerably more than half of the net increase of £4,700,000 over the Navy Estimates for the current year.

As in the Estimates for 1924–25, a special overhead deduction has, by decision of H.M. Government, been made on the provision for contract work in Votes 8, 9, and 10, to discount in advance possible delays in the progress of such work. This reduction of the money provision is not intended to affect the normal progress of the services to which it applies, and if the delays do not in fact occur, Parliament will in due course be invited to make good the deficiency to such extent as may be necessary.

The Estimates as now presented to Parliament include no provision for the commencement of any new construction.

The Admiralty's proposals for construction for 1925–26 form part of a programme considered necessary during a period of several years in order to maintain the accepted standard of naval strength, the chief feature in the programme being the replacement of cruisers which have become or are becoming obsolete. H.M. Government is at present proceeding with the investigation which the late Government declared its intention of making into this question as a whole, and proposals as regards new construction will be laid before Parliament at a later date when the inquiry has been completed.

I have already alluded to the inclusion in these Estimates for the first time of a charge—amounting in 1925–26 to £1,320,000—in respect of the cost of the Fleet Air Arm. This sum is credited in the Air Estimates as a grant in aid of the expenditure for which provision is made in those Estimates. The reason for this arrangement appears to have been misunderstood, but it is quite simple.

It has been formally laid down, on the recommendation of the Committee on the Relations between the Navy and the Air Force, that it rests with the Admiralty to formulate requirements for the Fleet Air Arm. It is obvious, therefore, that it must also rest with the Admiralty to justify those requirements, whether they are challenged from the point of view of adequacy or of economy. It is this Admiralty responsibility that is duly recognized by including the charge in the Estimates for which I have to answer.

Provision is made for the resumption of work on the development of the Naval Base at Singapore which is a vital link in the chain of communication with British Dominions in the Pacific. The reasons which were advanced by the late Government for suspending this scheme have been examined by His Majesty's present advisers, who have found them unconvincing. Further evidence of a practical kind has been forthcoming to show the interest felt in this question by British communities overseas. The Colonial Government of Hong Kong has generously subscribed towards the cost of the Singapore Base £250,000, which are the profits of shipping control during the war. This gift, with the present of the land by the Government of the Straits Settlements, which has remained good in spite of the suspension of the scheme, will save the taxpayers of this country the whole expenditure on Singapore Base in the Works Vote for the coming financial year.

W. C. Bridgeman.

Admiralty,
March 9, 1925.

NOTES ON MATTERS OF GENERAL INTEREST AFFECTING THE NAVY.

Cruise of the Special Service Squadron.

The ships of the Special Service Squadron, consisting of the battle cruisers Hood and Repulse and the light cruisers Delhi, Danae, Dauntless, and Dragon, under the command of Vice-Admiral Sir Frederick L. Field, K.C.B., K.C.M.G., completed their cruise round the world and reached England on September 29, 1924. They were received at all ports of call with the greatest cordiality.

The cruise occupied approximately 307 days, the battle cruisers being 133 days at sea and 174 days in harbour; the light cruisers 154 days at sea and 153 days in harbour. The approximate distance run was 38,000 miles by the battle cruisers and 45,000 miles by the light cruisers.

Co-operation with the Dominions.

H.M.A.S. Adelaide, a cruiser of the Royal Australian Navy, joined the ships of the Special Service Squadron on their arrival in Australian waters and accompanied them to England. She has now returned to Australia in company with H.M.S. Concord, which is being attached for a period to the Royal Australian Navy.

H.M.S. Dunedin left England with the Special Service Squadron, and on arrival in New Zealand waters was transferred to the New Zealand Division of the Royal Navy.

The New Zealand Government has intimated that the Dominion is prepared to maintain a second cruiser of the same type as Dunedin. Arrangements are therefore being made for H.M.S. Diomede to be transferred to the New Zealand Station in October next.

Naval Air Work.

(*a*) *Fleet Air Arm.*—In accordance with the decision of H.M. Government in 1923–24 on the manning of the Fleet Air Arm, a commencement was made in June last with the training of naval officers as pilots for service in the fleet, when 50 officers were sent to No. 1 Flying Training School at Netheravon to begin their training. After about ten months on shore—which includes six months' elementary flying training at Netheravon followed by a period at coastal stations, where training is continued on machines of the naval service type and instruction is given in naval air work—these officers will be appointed to relieve an equivalent number of R.A.F. officers as pilots for service in units of the Fleet Air Arm.

There will in future be four courses a year. Thirty officers were appointed to the second course beginning in January last.

With a view to accelerating the permeation of the more senior ranks of the Navy with practical knowledge of air matters which will come about when naval officers trained as observers and pilots reach these ranks, it has been arranged for a few officers of the rank of commander to undergo short courses of flying training. One such course is now in progress.

The training of naval officers for observer duties continues and the syllabus of the Observers' Course, which has recently been revised, includes training to qualify these officers to undertake reconnaissance observation (hitherto performed by R.A.F. officers) in addition to gunnery spotting observation.

Progress has also been made in the substitution of naval ratings for certain of the R.A.F. personnel serving in the Fleet Air Arm, under the Government decision above referred to, the number of naval ratings so substituted to date being 250.

(*b*) *Airships.*—The Admiralty are greatly interested in the development of airships in view of their possible value for the purpose of naval reconnaissance in great oceans.

They are engaged in concert with the Air Ministry in studying the designs of mooring masts in ships, which are an important development and, if successful, will enhance the value of airships for naval purposes, reduce base expenditure and render bases mobile.

General Fleet Training.

Economy in the expenditure of fuel has of necessity imposed much restriction upon the tactical training of the fleet, but good use has been made of the limited opportunities available and progress has been maintained.

A large number of ships of the Reserve Fleet were completed to full complement in July, 1924, and exercises were carried out.

Following the practice observed in former years, both before and since the war, of taking advantage of the facilities for the handling of larger fleets and of the finer weather conditions prevailing in the Mediterranean at this time of year, arrangements have been made for the Atlantic and Mediterranean Fleets to meet in the vicinity of Majorca for a series of tactical exercises.

Gunnery and torpedo practices have been mainly directed to consolidating war experience. During the year H.M.S. Monarch was used for firing experiments, culminating in the sinking of this vessel by gunfire from the ships of the Atlantic Fleet. This not only provided valuable information, but gave an opportunity to the younger officers and men to take part in a live shell practice against a ship target.

The successful defence of H.M. ships against aircraft is receiving increased attention, and the installation of an adequate armament backed by modern instruments is being pressed forward. Bombardment practices in co-operation with land forces have been carried out by various squadrons with satisfactory results and established an effective liaison with the Army in this important form of operation.

Personnel.

The personnel of the fleet proposed in Vote "A" for 1925–26 amounts to 102,675, an increase of 2,175 over 1924–25.

This number includes most of the provision for Nelson, Rodney, Courageous, Glorious, Emerald, Adventure, two destroyers and two patrol submarines, and for the Fleet Air Arm, after allowing for the personnel released by the scrapping (in accordance with the Washington Conference) of Thunderer and three vessels of King George V. class. Although all the above vessels will not be ready for commission during 1925–26, all are under construction, and some of them are approaching completion, and it is necessary to begin the entry and training of the additional numbers required.

A small proportion (less than one-tenth) of the numbers required for the five Kent class now under construction is also included in this year's Vote "A."

The remainder of the personnel for Nelson, Rodney, and other ships referred to above, and the large proportion of the numbers required for the Kents, would normally have been included in this year's estimates, but the reduced numbers are put forward pending the result of an inquiry which H.M. Government is instituting into the whole manning question.

Although all ranks and ratings have always been liable for service in submarines, these vessels formed until recently so small a proportion of the fleet as a whole that it was possible to man them entirely with volunteers. Now that their relative proportion to the Navy as a whole is greatly increased, submarines will in future be manned on the same system as all other ships. Preference will, however, still be given to volunteers for this service.

We propose to set up a committee to investigate the future requirements of officers with special reference to numbers and to the flow of promotion.

Promotion among ratings in certain branches has been slow as an after effect of the war, but this is beginning to right itself as normal conditions are re-established.

The modifications in the system of selection and examination introduced by the War Office as a result of the recommendations of Lord Haldane's Committee have been adopted for Special Entry and Paymaster Cadetships, with the exception that the Admiralty have not altered the age limits for candidates. Two entries of cadets a year (June and November) are now being made by this method, and at least fifteen Special Entry Cadetships will be offered for competition at each examination.

With the object of strengthening a long-standing link with the Mercantile Marine Training Establishments, the entry of a limited number of cadets from Conway, Worcester, and the Nautical College, Pangbourne, has been extended. Candidates from these establishments are now selected at a somewhat later age, and, like the Special Entry Cadets, undergo, if successful, a year's course of training before passing for midshipmen.

The course of training in engineering at the Royal Naval Engineering College, Keyham, has been re-organized in accordance with the most modern ideas, and very satisfactory progress is being made by the officers under instruction.

The extent to which lower deck ratings are availing themselves of the educational facilities now provided is shown by the large numbers who enter for the various examinations. This is particularly noticeable in the Higher Educational Test. This examination was first held in its present form in April, 1919, since when it has taken place twice a year, and the number of candidates has steadily increased.

Vocational training of men at the three home ports, in order to improve their qualifications for obtaining employment after leaving the Service, had already been inaugurated prior to the commencement of the financial year 1924–25. The total numbers of men who have completed such training at the home ports during the year has been considerable, if allowance is made for the short time that the scheme has been working and the practical difficulty of arranging the courses so as not to interfere with naval drafting requirements.

During the financial year, a beginning has been made with vocational training on foreign stations, chiefly at shore bases such as Malta. We hope during the forthcoming year to develop this kind of instruction in seagoing ships to a greater degree.

In order to facilitate emigration to the Overseas Dominions, arrangements have been made with the Canadian, Australian, and South African Governments by which Royal Fleet Reservists will be able to settle in the Dominions referred to without taking their discharge from the Reserve and so forfeiting the prospect of gratuity or pension. Royal Fleet Reservists emigrating to Canada or Australia will perform periodical training in Dominion ships or naval establishments. Those in South Africa will perform their training in H.M. ships on the Africa Station.

Ship Construction.

(*a*) The following new ships have been completed in the Royal Dockyards and passed into commission :—

Cruiser	Frobisher.
Flotilla Leaders . . .	Broke and Keppel.
Destroyers	Shikari, Whitehall, and Witch.
Submarines	L.23, L.53, and L.54.

The trials of submarine X.1 are still in progress, and on their satisfactory completion the vessel will be available for service.

(*b*) Two cruisers of the Kent class and two destroyers, for the commencement of which provision was made in the Estimates for 1924–25, have been laid down in contractors' yards, and the construction of these and of other ships building by contract has proceeded satisfactorily during the year.

The remaining three cruisers of the Kent class have been laid down at Portsmouth, Devonport, and Chatham, respectively, and satisfactory progress on them is being made.

(*c*) The work of re-constructing Furious as an aircraft-carrier is well advanced and will be completed early in the ensuing financial year, and good progress is also being made with other ships in hand for reconstruction.

(*d*) The programme for 1925–26, as above stated, includes no new construction. It provides for the completion of:

Cruisers	Effingham, Emerald, and Enterprise.
Submarines	L.26 and L.27;

while the construction of the battleships Nelson and Rodney, the five cruisers of the Kent class, the minelayer Adventure, the destroyers Amazon and Ambuscade, and submarine O.1 will be further advanced.

(*e*) Provision is also taken to make a beginning in the Royal Dockyards on the large programme of retubing work which will be rendered necessary during the next few years by reason of the life of boiler tubes of cruisers and destroyers built during the war coming to an end almost simultaneously.

General Remarks.

(*a*) *China.*—The continuance of disturbances in China, together with the prevalence of piracy in the Yangtse and Canton Rivers, have been a strain on the resources of the China Station. The gunboats maintained on the Yangtse River for the protection of British interests are rapidly nearing the end of their effective life, and will be gradually replaced by new construction as circumstances permit. Four motor launches have been sent out to assist the gunboats in the patrol of the Yangtse. In the Canton River useful service is being performed by river launches provided by the Hong Kong Government and manned by the Navy.

(*b*) *Fishery Protection.*—The Fishery Patrol Service has kept in touch, by means of visits as opportunities offered and otherwise, with the Fishery Protection Services of other nations, and satisfactory relations have been maintained. With a view to more efficient protection vessels of the patrol boat type are being substituted for trawlers in areas in which speed is indispensable to effective patrol work.

(*c*) *Washington Treaty.*—The obligations of the Washington Naval Treaty, as regards the scrapping of capital ships, have been duly carried out. H.M. ships Agamemnon and Colossus, after being rendered incapable of further warlike service, have been retained as a target ship and a stationary training ship respectively, as was authorized by the Treaty. H.M.A.S. Australia and H.M.S. Monarch were sunk at sea. The remaining ships, eighteen in number, representing some 400,000 tons of material, were sold to, and broken up by, shipbreaking firms in this country.

(*d*) *Slave Trade.*—A regular patrol has been maintained in the Red Sea with satisfactory results.

In May, and again in November, 1924, a Division of six destroyers was sent to work in co-operation with the sloops, and all the principal ports were visited.

(*e*) H.M.S. Caroline has been allocated as drill ship to the new Ulster Division of R.N.V.R., and it is hoped that recruiting will proceed briskly during the course of the year.

(*f*) The Naval Inter-Allied Commission of Control in Germany has been withdrawn, the purely naval clauses of the Treaty having been completely carried out.

W. C. Bridgeman.

PROGRAMME OF NEW CONSTRUCTION.

The existing programme of construction in Navy Votes, 1925–26, provides for progress on

2 battleships (Nelson and Rodney).
5 cruisers (Kent class).
3 cruisers (Effingham, Emerald, and Enterprise to be completed).
1 minelayer.
2 destroyers.
3 submarines (1 " O " class. Two " L " class to be completed).

The total provision in Navy Estimates for the above programme is £6,708,567, but if construction proceeds uninterruptedly and accounts can be liquidated punctually the total expenditure may prove to be about £7,647,000 or about £939,000 more, and the amount remaining to be met in subsequent years is £10,158,000 or £9,219,000 if the £939,000 is paid in 1925–26.

New Proposals.

It is proposed to adopt the following programme of new construction in the years 1925–26 to 1929–30 :—

—	1925–26.	1926–27.	1927–28.	1928–29.	1929–30.
Cruisers :					
Class "A"	4	2	1	1	1
Class "B"	—	1	2	2	2
Aircraft-carriers	—	—	—	—	1
Destroyers	—	—	9	9	9
Submarines "O" type	—	6	6	6	5
,, Fleet type	—	—	—	—	1
Gunboats	4	—	—	1	—
Motor launches	—	4	—	—	—
Submarine depôt ships	—	1	—	1	—
Net layer	—	—	—	—	1
Repair ship	—	1	—	—	—
Floating dock	1	—	—	—	—

Together with the necessary steam and motor boats.

The total cost of the above programme is estimated at £58,000,000.

The cost which it is expected will fall on Navy Votes for 1925–26 to 1929–30 in respect of this programme is £37,670,000.

The total expenditure falling to be met year by year in the above period if construction proceeds uninterruptedly is :

—	1925–26.	1926–27.	1927–28.	1928–29.	1929–30.
	£	£	£	£	£
Old programme	7,647,000	6,954,000	2,197,000	68,000	—
New programme	527,170	3,724,000	8,526,000	11,997,000	12,896,000
	8,174,170	10,678,000	10,723,000	12,065,000	12,896,000

In the light of all past experience, however, it is reasonable to anticipate that payments will not fall due at the above rate and a deduction of 10 per cent. or more over part of the programme will almost certainly be made in order to arrive at the estimates laid before Parliament in any given year.

W. C. Bridgeman.

Admiralty,
July 27, 1925.

ABSTRACT OF THE NAVY ESTIMATES, 1925–26.

Votes.		Estimates for 1925–1926. Gross Estimate.	Estimates for 1925–1926. Net Estimate.	Estimates, 1924–1925. Net Estimate.
	I.—NUMBERS.		Maximum Numbers.	Maximum Numbers.
A	Number of Officers, Seamen, Boys, and Royal Marines	102,675	102,675	100,500
A	Number of Marine Police	350	350	287
	II.—EFFECTIVE SERVICES.	£	£	£
1	Wages, etc., of Officers, Seamen, and Boys, Coast Guard, and Royal Marines	15,129,386	15,040,300	14,426,200*
2	Victualling and Clothing for the Navy	5,453,400	4,509,900	4,258,100
3	Medical Establishments and Services	498,169	457,600	462,500
4	Fleet Air Arm	1,320,000	1,320,000	—
5	Educational Services	408,531	336,000	341,800
6	Scientific Services	508,886	438,400	440,000
7	Royal Naval Reserves	487,080	486,000	491,500
8	Shipbuilding, Repairs, Maintenance, etc.:			
	Section I.—*Personnel*	8,027,348	7,862,000	7,045,000
	Section II.—*Matériel*	8,578,100	7,167,900	5,397,900
	Section III.—Contract Work	5,887,000	5,764,500	5,820,300
9	Naval Armaments	4,711,900	4,361,900	3,975,500
10	Works, Buildings, and Repairs at Home and Abroad	3,028,000	2,588,000	3,080,000
11	Miscellaneous Effective Services	884,773	790,600	856,100
12	Admiralty Office	1,252,897	1,246,100	1,229,500
	Total Effective Services . £	56,175,470	52,369,200	47,824,400
	III.—NON-EFFECTIVE SERVICES.			
13	Naval and Marine, Officers	2,911,763	2,889,800	2,884,300
14	Naval and Marine, Men	4,436,700	4,401,900	4,253,500
15	Civil Superannuation, Compensation Allowances, and Gratuities	839,527	839,100	837,800
	Total Non-Effective Services . £	8,187,990	8,130,800	7,975,600
	GRAND TOTAL . . £	64,363,460	60,500,000	55,800,000†

NET INCREASE . . . . . £4,700,000.

ADMIRALTY,
March 2, 1925.

W. C. BRIDGEMAN. M. SEYMOUR. J. D. KELLY. FRED. C. DREYER.
BEATTY. C. FULLER. ROGER KEYES. STANHOPE.

J. C. C. DAVIDSON, O. MURRAY — Secretaries.

* For purposes of comparison these figures include the amounts provided under Vote 4, in 1924-25, for civilians employed on Fleet Services.

† Exclusive of Supplementary Estimate.

STATEMENT SHOWING THE NUMBERS BORNE, THE EXPENDITURE ON NAVAL SERVICES FOR THE YEARS 1914-1915 TO 1923-1924, AND THE ESTIMATES FOR 1924-1925 AND 1925-1926.

YEAR.	VOTE A. — Average numbers borne.	VOTE 1. — Wages, &c., of Officers, &c.	VOTE 2. — Victualling and Clothing.	VOTE 3. — Medical Establishments, &c.	VOTE 4. — Civilians employed on Fleet Services.	VOTE 5. — Educational Services.	VOTE 6. — Scientific Services.	VOTE 7. — Royal Naval Reserves.	VOTE 8. — Shipbuilding, Repairs, Maintenance, &c. Section I. Personnel.	VOTE 8. Section II. Matériel.	VOTE 8. Section III. Contract Work.	VOTE 9. — Naval Armaments.	VOTE 10. — Works.	VOTE 11. — Miscellaneous.	VOTE 12. — Admiralty Office.	VOTE 13. — Half Pay, &c.	VOTE 14. — Naval, &c., Pensions.	VOTE 15. — Civil Superannuation, &c.	Balances Irrecoverable.	Total Expenditure.
		£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
1914-15	151,000	8,926,000	3,863,602	309,773	115,500	242,857	99,648	493,108	4,016,200	7,736,800	14,380,760	5,667,550	3,632,000	532,034	492,642	1,027,816	61,637,151	399,760	—	53,573,261 (c)
1915-16	297,008	24,321,519	10,796,024	578,703	444,907	171,610	108,535	755,201	7,868,812	44,778,970	64,513,255	25,649,203	5,710,782	16,321,128	851,066	717,519	1,730,117	400,161	17,085	205,733,597
1916-17	349,578	29,399,358	11,173,592	713,525	517,209	201,497	110,478	863,943	8,943,491	40,952,653	53,982,842	36,742,534	6,694,878	15,460,001	1,024,106	713,621	1,944,003	388,509	50,976	209,877,218
1917-18	406,977	37,559,536	13 481,159	792,569	561,308	210,243	152,160	874,930	12,660,160	36,494,694	70,609,055	34,177,359	6,556,769	9,193,802	1,454,835	709,227	1,446,247	413,746	41,092	227,388,891
1918-19	381,311	46,373,511	24,219,351	1,158,287	491,270	247,922	262,886	871,970	15,037,763	59,128,675	94,248,874	64,866,784	10,928,241	9,357,532	1,985,894	704,914	3,733,778	445,485	28,090	334,091,227
1919-20	176,087	32,385,306	8,823,106	733,046	556,778	401,864	364,832	458,044	12,426,177	*Credit :— 785,986*	48,348,933	14,441,835	5,595,608	11,118,631	2,042,715	1,176,937	15,133,064	802,279	60,875	154,084,044
1920-21	124,009	21,314,360	8,311,708	683,830	759,110	503,152	249,185	359,694	12,096,747	6,799,965	12,001,445	8,493,951	4,992,969	5,724,974	2,073,764	2,352,344	4,847,475	880,996	23,611	92,505,290
1921-22	127,180	19,220,859	6,831,481	643,735	480,243	405,592	359,575	423,056	10,690,188	8,835,771	4,834,336	6,253,468	4,746,485	3,506,514	1,780,641	2,002,201	3,881,368	1,020,693	69,935	75,986,141
																Non-effective Services. Officers.	Men.			
1922-23	107,782	15,762,232	4,767,118	492,419	258,600	382,065	354,961	423,722	7,075,533	3,877,716	3,225,598	3,678,783	3,553,831	2,096,219	1,371,961	3,701,984	5,471,088	968,860	29,679	57,492,389
1923-24	99,107	14,175,111	4,153,803	410,842	193,793	330,640	379,489	459,391	6,751,496	5,521,336	4,427,874	3,840,606	3,215,766	982,173	1,247,813	2,856,764	4,260,245	823,340	33,864	54,064,350
1924-25 (Estimate)	100,787(a)	14,245,000	4,258,100	462,500	181,200	341,800	440,000	491,500	7,450,000	5,397,900	5,820,300	3,975,500	3,080,009	856,100	1,229,500	2,884,300	4,253,500	837,800	—	55,800,000
1925-26 (Estimate)	103,025(a)	15,040,300	4,509,900	457,600	Fleet Air Arm (b) 1,320 000	336,000	438,400	486,000	7,862,000	7,167,300	5,764,500	4,361,900	2,588,000	790,600	1,246,100	2,889,800	4,401,900	839,100	—	60,500,000

Note.—The figures under Vote 9 include the cost of Naval Aviation Services from the year 1916-1917 to the year 1919-1920 inclusive.

(a) Maximum for the year, including Marine Police. (b) Replacing "Civilians employed on Fleet Services" transferred to Vote I. in 1925-26. (c) Total gross estimate.

EXPENDITURE FOR NAVAL PURPOSES OF THE PRINCIPAL FOREIGN POWERS.

UNITED STATES NAVY.

Appropriation Act, July 1, 1925, to June 30, 1926.

		1925–1926. Dollars.	1924–1925. Dollars.
Naval Secretary's Department, including various out-stations and Office of Naval Operations		3,598,236	4,730,630
Bureau of Navigation, including Transport and Recruiting	$6,894,810		
Naval Reserve	3,900,000		
Hydrographic Office, Observatory, etc.	425,000	11,219,810	10,843,661
Bureau of Engineering		19,961,000	18,008,000
Bureau of Construction and Repairs		17,315,000	15,918,000
Bureau of Ordnance		11,982,250	10,984,600
Bureau of Supplies and Accounts:			
Pay of the Navy	$117,000,000		
Maintenance, freight, fuel, etc.	45,890,000		
		162,890,000	151,730,000
Bureau of Medicine and Surgery		2,268,400	2,347,620
Bureau of Yards and Docks		9,858,500	9,707,980
Bureau of Aeronautics		14,981,000	15,328,500
Naval Academy		1,933,968	2,000,157
*Marine Corps:			
Pay	$15,574,650		
Quartermaster's Department	8,375,000		
		23,949,650	25,566,140
†Increase of the Navy		11,444,000	22,450,000
		291,401,814	289,615,288
Miscellaneous		9,000,000	4,704,582
Total		300,401,814	294,319,870‡

* The United States Navy having its own Air Service, the pay of personnel, etc., is included under heading of Pay of the Navy.

† In addition, unexpended balances are to be added to this item for necessary work.

‡ The par rate of exchange is $4·866 to the £.

IMPERIAL JAPANESE NAVY.

Estimates, 1925–26.

The Estimates of the Imperial Japanese Navy are divided under two headings, "Ordinary" and "Extraordinary."

The figures for 1925–26 as compared with the previous year are as follows:—

	1925–26. Yen.	1924–25. Yen.
Ordinary	122,349,150	127,068,145
Extraordinary	105,016,934	154,993,417
Total	227,366,084	*282,061,562

The "Ordinary" expenditure is for pay, provisions, etc., and the general upkeep of the Fleet and its Air Service, and the "Extraordinary" expenditure for new construction and additions and improvements to the present Fleet and its Air Service and establishments.

* The par rate of exchange is 9·75 yen to the £.

FRENCH NAVY.

ESTIMATES, 1925–26.

The Estimates of the French Navy are shown divided under two headings, "Ordinary" and "Extraordinary."

The figures for 1925-26, including the votes for new construction, as compared with the previous year, are as follows :—

	1925–26. Francs.	1924–25. Francs.
Ordinary		1,019,283,600
Extraordinary		32,800,000
Total	*	1,052,083,600

* The par rate of exchange is 25·225 frs. to the £.

ROYAL ITALIAN NAVY.

ESTIMATES, 1925–26.

ORDINARY EXPENDITURE.	1925–26. Lire.	1924–25. Lire.
General Expenses	4,551,000	4,646,400
Pensions	56,270,000	54,070,000
Education	3,855,600	3,735,600
Lighthouses and Pilotage	5,763,400	5,603,000
Maintenance, Construction, Armaments, Establishments, and Coast Works	864,209,400	807,017,800
Total	934,649,400	875,072,800
EXTRAORDINARY EXPENDITURE.		
General and Various	45,350,600	49,973,230
Total	980,000,000	925,046,030

* The par rate of exchange is 25·225 lire to the £.

BRITISH AND FOREIGN NAVAL ATTACHES.

British Naval Attachés Accredited to Foreign Countries.

To:—

Albania, Bulgaria, Greece, Italy, Roumania, Serbia, and Turkey: Naval Attaché, Commander Richard T. Down, C.V.O., D.S.O. (appointed 20th July, 1922); Headquarters, Rome, Italy.

Belgium, France, Netherlands, Portugal and Spain: Naval Attaché, Captain J. M. Pipon, C.M.G., M.V.O., O.B.E. (appointed 15th July, 1925); Headquarters, Paris, France.

Denmark, Esthonia, Finland, Germany, Latvia, Norway, Poland and Sweden: Naval Attaché, Captain Wion M. Egerton (appointed 15th February, 1923); Headquarters, Berlin, Germany.

Japan and China: Naval Attaché, Captain Guy C. Royle, C.M.G. (appointed 5th January, 1924): Headquarters, Tokyo, Japan.

North and Central America, including Costa Rica, Cuba, Haiti, Honduras, Mexico, Nicaragua, Panama, Salvador, San Domingo, and the United States: Naval Attaché, Captain The Hon. Arthur Stopford, C.M.G. (appointed October, 1925); Assistant Naval Attaché, Engineer-Commander A. Knothe (appointed 6th June, 1925): Headquarters, Washington, D.C., U.S.A.

South America, including the Argentine Republic, Brazil, Chile, Columbia, Ecuador, Paraguay, Peru, Uruguay, and Venezuela: Naval Attaché, Captain J. S. C. Salmond (appointed 6th Feb., 1925).

Foreign Naval Attachés Accredited to Great Britain.

From:—

Argentine Republic: Naval Attaché, Capitàn de Fregata Don Jorge A. Games: Address, 4, Palace Place Mansions, Kensington Court, London, W.8.

Brazil: Naval Attaché, Capitao de Corveto Amerigo de Araujo Pimentel: Address, 19, Upper Brook Street, London, W.1.

Denmark: Naval Attaché, Commander C. V. Evers: Address, 29, Pont Street, London, S.W.1.

France: Naval Attaché, Capitaine de Vaisseau Comte de Ruffi de Pontevès-Gévaudan, D.S.O.: Address, Albert Gate House, Hyde Park, London, S.W.1.

Greece: Naval Attaché, Commander Gerassimos Vassiliades: Address, Flat B, Upper Feilde, Park St., London, W.1.

Italy: Naval Attaché, Captain Count G. A. Raineri-Biscia, C.V.O.,: Address, 28, Norfolk Street, Park Lane, London, W.1.

Japan: Naval Attaché, Captain Teijiro Toyoda, D.S.O.; Assistant Naval Attaché, Lieut.-Commander S. Iwamura: Address, Broadway Court, Broadway, Westminster, London, S.W.1.

Norway: Naval Attaché, Commander K. Prestrud: Address, Norway House, 21-24, Cockspur Street, Westminster, London, S.W.1.

Portugal: Naval Attaché, Commander Fernando Branco: Address, 12, Taviton Street, Gordon Square, London, W.C.1.

Peru: Naval Attaché, Capitan de Fragata Don Frederico C. Taboada: Address, Peruvian Legation, 28, Holland Park, London, W.11.

Poland: Naval Attaché, Major le Comte Roman Michalowski: Address, Polish Legation, 47, Portland Place, London, W.1.

Soviet Union: Naval Attaché, Monsieur Eugene Berens: Address, 128, New Bond Street, London, W.1.

Spain: Naval Attaché, Capitan de Corbeta Don Fernando Navarro y Cap de Villa: Address, Spanish Embassy, 1, Grosvenor Gardens, Westminster, London, S.W.1.

Sweden: Naval Attaché, Commander A. H. de Bahr, C.V.O.: Address, 27, Portland Place, London, W.1.

United States of America: Naval Attaché, Captain Luke McNamee; Assistant Naval Attachés, Commander H. F. Leary, Commander John H. Towers, Commander C. Ashton Jones, and Commander J. C. Hunsaker (CC): Address, 6, Grosvenor Gardens, Westminster, London, S.W.1.

MERCHANT SHIPPING
REFERENCE SECTION.

MERCHANT SHIPPING REFERENCE SECTION.

CONTENTS.

NUMBER AND GROSS TONNAGE OF THE VESSELS OF 100 TONS GROSS AND UPWARDS (STEAM, SAIL, AND MOTOR) BELONGING TO EACH OF THE SEVERAL COUNTRIES OF THE WORLD, AS RECORDED IN LLOYD'S REGISTER.

Flag.	June, 1913.†		June, 1919.		June, 1922.	
	No.	Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
Gt. Britain and Ireland	9,214	18,696,237	7,964	16,555,471	8,849	19,295,637
British Dominions	2,073	1,735,306	2,141	2,052,404	2,472	2,746,883
Total	11,287	20,431,543	10,105	18,607,875	11,321	22,042,520
United States of America — Sea	2,696	2,998,457	4,350	10,782,170	4,886	14,738,506
United States of America — Lakes	627	2,382,690	506	2,257,786	495	2,247,690
United States of America — Philippine Islands	77	46,489	73	51,817	99	76,264
United States of America — Total	3,400	5,427,636	4,929	13,091,773	5,480	17,062,460
Argentine	308	214,835	215	154,441	216	181,555
Austria-Hungary	427	1,011,414	339	714,617	—	—
Belgium	172	304 386	152	313,276	275	579,477
Brazil	459	329,637	428	512,675	399	492,571
Chili	131	139,792	114	101,647	126	131,401
China	66	86,690	102	132,515	134	188,388
Cuba	59	61,536	51	47,295	65	62,677
Denmark	811	762,054	645	702,436	822	1,038,138
Esthonia	—	—	—	—	98	45,259
Finland	—	—	338	180,962	352	213,671
France	1,552	2 201,164	1,440	2,233,631	2,094	3,845,792
Germany	2,321	5,082,061	1,768	3,503,380	1,723	1,887,408
Greece	442	722,782	312	323,796	379	668,127
Holland	759	1,309,849	931	1,591,911	1,164	2,632,713
Italy	1,114	1,521,942	858	1,370,097	1,413	2,866,335
Japan *	1,037	1,500,014	1,418	2,325,266	2,026	3,586,918
Latvia	—	—	—	—	67	40,124
Norway	2,191	2,457,890	1,629	1,857,829	1,852	2,600,861
Peru	60	45,514	63	79,342	74	101,209
Portugal	208	120,579	227	261,212	286	285,878
Roumania	33	45,408	35	63,792	31	72,297
Russia	1,216	974,178	618	541,005	—	—
Spain	607	840,995	576	750,611	973	1,282,757
Sweden	1,436	1,047,270	1,263	992,611	1,345	1,115,375
Turkey	272	157,298	161	116,249	—	—
Uruguay	65	75,531	43	44,499	53	76,311
Other Countries and flag not recorded	158	98,115	495	304,530	1,167	1,270,564
Total	30,591	46,970,113	29,255	50,919,273	33,935	64,370,786

* Japanese sailing vessels are not recorded in Lloyd's Register Book.

† In 1913 the figure shown is the total of the gross tonnage of steam and motor vessels, and the *net* tonnage of sailing vessels; in 1919 and subsequent years the figure is given in gross tons throughout.

NUMBER AND GROSS TONNAGE OF THE VESSELS OF 100 TONS GROSS AND UPWARDS (STEAM, SAIL, AND MOTOR) BELONGING TO EACH OF THE SEVERAL COUNTRIES OF THE WORLD, AS RECORDED IN LLOYD'S REGISTER—*continued.*

Flag.		June, 1923.		June, 1924.		June, 1925.	
		No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
Gt. Britain and Ireland		8,694	19,281,549	8,559	19,105,838	8,559	19,440,711
British Dominions		2,441	2,776,563	2,449	2,772,662	2,430	2,781,487
Total		11,135	22,058,112	11,008	21,878,500	10,989	22,222,198
United States of America	Sea	4,812	14,597,035	4,508	13,530,544	4 265	12,948,632
	Lakes	513	2,286,619	524	2,361,464	525	2,364,920
	Philippine Islands	91	61,709	96	64,959	92	63,928
	Total	5,416	16,945,363	5,128	15,956,967	4,882	15,377,480
Argentine		199	178,465	215	199,185	226	222,759
Austria-Hungary		—	—	—	—	—	—
Belgium		270	616,670	251	560,597	240	542,583
Brazil		362	478,630	375	464,734	374	465,643
Chili		137	171,958	147	181,092	144	185,758
China		157	222,970	168	248,108	178	269,937
Cuba		64	50,425	70	59,523	70	61,502
Denmark		780	996,862	764	1,035,943	772	1,059,846
Esthonia		112	49,403	108	45,897	111	46,277
Finland		319	200,254	322	207,952	324	210,829
France		2,021	3,737,244	1,857	3,498,233	1,828	3,511,984
Germany		1,843	2,590,073	2,003	2,953,671	2,028	3,073,713
Greece		405	755,441	409	761,210	459	897,873
Holland		1,114	2,625,741	1,082	2,556,417	1,099	2,600,831
Italy		1,415	3,033,742	1,299	2,832,212	1,353	3,028,661
Japan *		2,003	3,604,147	2,055	3,842,707	2,087	3,919,807
Latvia		55	39,006	69	46,281	72	52,712
Norway		1,800	2,551,912	1,753	2,505,393	1,805	2,680,642
Peru		47	82,193	38	70,821	39	75,723
Portugal		284	301,607	279	301,308	284	299,921
Roumania		32	73,848	39	71,183	37	67,851
Russia		—	—	397	338,792	377	322,257
Spain		949	1,260,206	950	1,239,521	930	1,184,721
Sweden		1,385	1,207,727	1,405	1,254,550	1,389	1,301,126
Turkey		—	—	134	105,148	174	132,244
Uruguay		67	85,511	68	79,920	65	76,770
Other Countries and flag not recorded		1,116	1,248,728	563	727,702	580	749,765
Total		33,507	65,166,238	32,956	64,023,567	32,916	64,641,418

* Japanese sailing vessels are not recorded in Lloyd's Register Book.

WORLD'S TOTAL MERCHANT TONNAGE, BRITISH AND IRISH TONNAGE, AND PERCENTAGE OF BRITISH AND IRISH TONNAGE OF THE WORLD'S TOTAL.

Year.	World.		Great Britain and Ireland.		Percentage of British and Irish Tonnage of Total.
	Number.	Tonnage.	Number.	Tonnage.	
1890	32,174	21,118,528	9,167	10,241,856	48·5
1891	32,277	22,912,753	9,098	10,585,747	46·2
1892	31,983	23,672,698	9,260	11,157,662	47·1
1893	31,926	24,236,865	9,333	11,563,997	47·7
1894	30,640	24,547,597	9,261	11,807,010	48·1
1895	30,288	25,086,199	9,227	12,117,957	48·3
1896	29,801	25,593,186	9,140	12,293,539	48·0
1897	28,280	25,889,044	9,107	12,403,409	47·9
1898	27,982	26,543,360	9,044	12,587,904	47·4
1899	27,816	27,613,851	8,973	12,926,924	46·8
1900	27,840	28,957,358	8,914	13,241,446	45·7
1901	28,209	30,479,971	8,934	13,656,161	44·8
1902	28,630	32,302,412	9,043	14,431,072	44·7
1903	28,901	33,501,855	9,152	14,889,571	44·4
1904	29,283	34,786,132	9,236	15,391,350	44·2
1905	29,750	35,998,180	9,348	15,803,180	43·9
1906	30,087	37,550,477	9,408	16,381,350	43·6
1907	30,197	39,435,788	9,517	16,999,668	43·1
1908	30,524	40,920,551	9,542	17,318,351	42·3
1909	36,536	41,447,825	9,491	17,377,936	41·9
1910	30,053	41,912,520	9,417	17,516,479	41·8
1911	30,082	43,144,909	9,334	17,872,697	41·4
1912	30,316	44,600,677	9,279	18,213,620	40·8
1913	30,591	46,970,113	9,214	18,696,237	39·8
1914	30,836	49,089,552	9,240	19,256,766	39·2
1915	30,720	49,261,769	9,285	19,541,368	39·7
1916	30,167	48,683,136	9,069	19,134,857	39·3
1917*	—	—	—	—	—
1918*	—	—	—	—	—
1919	29,255	50,919,273	7,964	16,555,471	32·5
1920	31,595	57,314,065	8,561	18,330,424	32·0
1921	33,206	61,974,653	9,034	19,571,554	31·6
1922	33,935	64,370,786	8,849	19,295,637	30·0
1923	33,507	65,166,238	8,694	19,281,549	29·6
1924	32,956	64,023,567	8,559	19,105,838	29·8
1925	32,916	64,641,418	8,559	19,440,711	30·1

* Figures for 1917 and 1918 not available.

NUMBERS OF STEAMERS AND MOTOR VESSELS OWNED BY THE PRINCIPAL MARITIME COUNTRIES ON JUNE 30, 1925, BY DIVISIONS OF GROSS TONNAGE.

Country.	Numbers of Vessels Owned of Various Gross Tonnages.										Total Number of Vessels owned.	Percentage of Total Number of Ships of 6000 gross tons and over.
	100 tons and under 500 tons.	500 tons and under 1000 tons.	1000 tons and under 2000 tons.	2000 tons and under 4000 tons.	4000 tons and under 6000 tons.	6000 tons and under 8000 tons.	8000 tons and under 10,000 tons.	10,000 tons and under 15,000 tons.	15,000 tons and under 20,000 tons.	20,000 tons and over.		
Gt. Brit. & Ireland	3,581	769	832	917	1,174	513	175	134	43	23	8,161	10·9
British Dominions	935	268	278	253	111	42	9	8	3	—	1,907	3·3
United States * .	636	179	216	917	747	502	86	37	6	3	3,329	19·0
Denmark . . .	182	98	219	100	34	11	5	3	—	—	652	2·9
France	667	97	172	275	183	66	41	22	2	2	1,527	8·7
Germany . .	911	357	256	183	122	68	31	14	1	4	1,947	5·5
Holland . . .	403	60	161	175	100	98	33	10	4	2	1,046	14·1
Italy	306	90	102	196	215	91	27	4	2	2	1,035	12·2
Japan	829	284	265	354	234	90	19	12	—	—	2,087	5·8
Norway . .	671	221	448	216	138	44	5	2	—	—	1,745	2·9
Spain	357	89	104	184	44	5	2	4	—	—	789	1·4
Sweden . . .	620	150	380	91	50	7	1	2	2	—	1,203	1·0
Other Countries .	1,520	464	512	499	219	44	14	2	3	—	3,277	1·9
Total for the whole World * . . .	11,618	3,126	3,845	4,360	3,371	1,581	448	254	66	36	28,705	8·3

* Excluding American Great Lakes vessels.

NUMBERS OF STEAMERS AND MOTOR VESSELS OWNED BY THE PRINCIPAL MARITIME COUNTRIES ON JUNE 30, 1925, BY DIVISIONS OF AGE.

Country.	Numbers of Vessels owned of Various Ages.						Total Number of Vessels owned.	Percentage of Total Number of Ships under 5 years old.
	Under 5 years.	5 years and under 10 years.	10 years and under 15 years.	15 years and under 20 years.	20 years and under 25 years.	25 years and over.		
Gt. Brit. & Ireland	1,312	1,870	1,441	1,016	918	1,604	8,161	16·1
British Dominions	228	316	292	318	237	516	1,907	12·0
United States * .	275	2,021	242	208	202	381	3,329	8·3
Denmark . . .	148	159	67	61	80	137	652	22·7
France	234	374	239	214	146	320	1,527	15·3
Germany . . .	578	336	214	244	172	403	1,947	29·7
Holland . . .	210	300	175	127	105	129	1,046	20·1
Italy	143	196	120	118	119	339	1,035	13·8
Japan	258	896	180	160	193	400	2,087	12·4
Norway . . .	267	478	246	216	178	360	1,745	15·3
Spain	63	199	52	54	46	375	789	8·0
Sweden . . .	94	209	103	121	110	566	1,203	7·8
Other Countries .	163	444	365	449	432	1,424	3,277	5·0
Total for the whole World * . . .	3,972	7,798	3,736	3,303	2,942	6,954	28,705	13·8

* Excluding American Great Lakes vessels.

NUMBER AND TONNAGE OF MOTOR VESSELS (EXCLUDING VESSELS FITTED WITH AUXILIARY MOTORS) OWNED BY VARIOUS NATIONS.

	June, 1922.		June, 1923.		June, 1924.		June, 1925.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Gt. Brit. & Ireland	214	355,461	139	374,873	173	507,251	220	738,734
British Dominions	99	36,973	44	14,084	58	17,659	69	37,272
United States * .	142	183,083	101	142,965	124	191,703	132	216,889
Denmark . . .	104	165,810	40	132,542	47	167,763	56	171,964
France . . .	65	33,656	34	27,958	27	25,892	27	34,824
Germany . . .	99	73,127	45	84,528	61	113,555	78	233,612
Holland . . .	95	75,684	52	66,577	55	69,450	64	124,262
Italy . . .	91	88,330	34	61,374	33	73,165	41	124,901
Japan	8	6,090	20	4,375	26	6,718	42	41,376
Norway . . .	240	197,973	130	177,071	126	192,002	156	324,567
Spain . . .	47	18,104	8	13,378	15	16,800	17	18,442
Sweden . . .	160	166,679	103	173,697	117	195,960	120	259,900
Other countries .	224	144,293	69	42,509	85	59,228	88	67,501
World's total *.	1,588	1,535,263	819	1,315,931	947	1,637,346	1,110	2,389,244

* Excluding American Great Lakes vessels.

FLUCTUATIONS IN THE PRICE OF A NEW, READY, 7,500-TON (D.W.) CARGO STEAMER.

Period.	£
1898 (Sept.)	48,500
1900 (Nov.)	60,630*
1905 (June)	36,500
1908 (June)	**36,000**
1910 (Jan.)	39,000
1912 (Nov.)	58,000
1914 (June)	42,500
1915 (Jan.)	60,000
1915 (June)	82,500
1915 (Sept.)	93,750
1916 (Jan.)	125,000
1916 (June	180,000
1916 (Dec.)	187,500
1918 (Jan.)	165,000
1918 (June)	180,500
1919 (Jan.)	169,000
1919 (June)	195,000
1920 (Jan.)	232,500
1920 (March)	**258,750**
1920 (June)	180,000
1921 (Jan.)	105,000
1921 (June)	63,750
1922 (Jan.)	60,000
1922 (June)	62,000
1923 (Jan.)	65,625
1923 (June)	62,500
1924 (Jan.)	60,000
1924 (June)	60,000
1925 (Jan.)	61,500
1925 (June)	55,500

Compiled from "Fairplay," July 2, 1925.

NOTE.—The highest and lowest prices are given in heavy type.

* Highest pre-war figure.

STEAMSHIP SUBSIDIES.

OFFICIAL RETURN OF THE SUMS PAYABLE out of the Exchequer in the United Kingdom in the Financial Year ending 1924, in respect of Steamship Subsidies for Foreign and Colonial services issued by the Treasury, July 30, 1924.

Name of Service.	Date of commencement of Contract.	Contract terminable.	Particulars of Service.	Total Subsidy.	Sums to be set off against gross Subsidy in respect of Contributions from Colonies, &c., sea postage for mails despatched by Colonies and Foreign Countries, &c.		Net Charge on Exchequer.	Remarks.
					By contributions.	By Sea postage		
I. *Overseas Services.*			Conveyance of:	£	(Partly estimated) £		£	
Cunard Steam Ship Co., Ltd.	7 Aug., 1902.	16 Nov., 1927.	Letter and Parcel mails to New York, and Parcel mails from New York.	57,845				
Oceanic Steam Navigation Co., Ltd. (White Star Line).	26 Aug., 1914.	At 12 months' notice.	Do.	66,616				
Peninsular and Oriental Steam Navigation Co., Ltd.	1 Feb., 1908.	At 2 years' notice.	Letter and Parcel mails between United Kingdom and India, China and Australia.	252,500				
African Steam Ship Co.	1 Jan., 1899.	At 3 months' notice.	Letter mails between United Kingdom and West Coast of Africa.	5,223	267,508*		254,878 (*a*)	(*a*) Includes £125,000 in respect of the British contribution to the Subsidy payable by the Union of South Africa to the Union Castle Mail Steam Ship Co.
British and African Steam Navigation Co., Ltd.	Do.	Do.	Do.	10,132				
Union Castle Mail Steam Ship Co., Ltd.	1 Oct., 1922.	30 Sept., 1924.	Letter and Parcel mails between United Kingdom and South Africa.	—				
Do. do.	1 Oct., 1893.	At 6 months' notice.	Calls by intermediate steamers at St. Helena and Ascension.	5,070				
II. *Cross-Channel Services.*								
Southern Railway (S.E. & C. Section).	Contract under	arrangements revision.	Letter and Parcel mails to France, and Indian mail in each direction.	70,000				
London, Midland & Scottish Railway (L. & N.W. Section).	28 Nov., 1920.	27 Nov., 1940.	Letter mails between Holyhead and Dublin.	89,850	35,400*		125,675	
Great Western Railway.	1 Nov., 1906.	Subject to revision according to development of traffic.	Letter mails between Fishguard and Rosslare (including conveyance by railway in England and Ireland).	1,225				
III. Cunard Steam Ship Co., Ltd.	30 July, 1903.	16 Nov., 1927.	The maintaining of a ship of approved speed and rights of pre-emption or hire of all the Company's ships.	90,000	Nil		90,000	

* The question of the amounts of contributions and sea postage for mails is under consideration, and the table may be considerably modified.

NUMBER AND TONNAGE OF MERCHANT VESSELS LAUNCHED.*

	1913.		1919.		1921.		1922.		1923.		1924.	
	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
Gt. Britain and Ireland	688	1,932,153	612	1,620,442	426	1,538,052	235	1,031,081	222	645,651	494	1,439,885
British Dominions †	77	26,744	235	298,495	49	118,303	37	53,347	41	37,072	29	29,815
United States †	182	228,232	852	3,579,826	166	995,129	55	97,161	69	96,491	71	90,155
Austria-Hungary	17	61,757	—	—	—	—	—	—	—	—	—	—
Denmark	31	40,932	46	37,766	37	77,238	23	41,016	24	49,479	33	63,937
France	89	176,095	34	32,633	65	210,663	62	184,509	27	96,644	26	79,685
Germany	162	465,226	No returns.		242	509,064	187	525,829	109	345,062	108	175,113
Holland	95	104,296	100	137,086	98	232,402	60	163,132	35	65,632	41	63,627
Italy	38	50,356	32	82,713	85	164,748	42	101,177	21	66,523	19	82,526
Japan	152	64,664	133	611,883	43	227,425	49	83,419	44	72,475	31	72,757
Norway	74	50,637	82	57,578	35	51,458	23	32,391	48	42,619	34	25,139
Russia	10	3,300	—	—	—	—	—	—	—	—	—	—
Spain	12	8,488	41	52,609	11	47,256	2	7,776	7	4,488	2	3,859
Sweden	25	18,524	53	50,971	27	65,911	14	30,038	10	20,118	12	31,211
Other Countries	71	34,967	36	26,755	81	81,374	57	84,813	27	20,410	14	25,670
World's Total	1713	3,282,071	2256	6,588,757	1365	4,319,023	846	2,435,689	684	1,562,664	914	2,183,379

* Figures given include all steamers and sailing vessels of 100 gross tons and upwards.

† Excluding vessels built at ports on the Great Lakes of America.

MERCHANT VESSELS UNDER CONSTRUCTION.*

	1913.		1919.		1921.		1922.		1923.		1924.	
	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.	No.	Gross Tonnage.
Gt. Britain and Ireland	513	1,956,606	757	2,994,249	515	2,640,319	315	1,468,599	360	1,395,181	286	1,296,971
British Dominions †	27	19,463	100	218,440	34	66,469	20	47,745	19	33,355	18	21,804
United States †	62	133,187	589	2,818,855	42	216,278	32	105,848	25	42,285	25	41,974
Austria-Hungary	16	63,300	—	—	—	—	—	—	—	—	—	—
Denmark	12	25,362	56	100,335	27	63,070	19	34,864	28	62,196	28	84,828
France	39	229,020	65	216,775	76	352,635	43	188,525	24	110,725	39	197,170
Germany	102	544,682	No returns.		No returns.		109	416,081	92	324,184	91	355,250
Holland	41	126,867	126	328,338	123	313,879	63	142,969	45	112,811	41	124,766
Italy	23	53,809	125	314,547	122	393,832	65	211,499	38	119,663	33	154,790
Japan	14	47,797	64	309,474	35	144,912	30	93,831	20	63,207	12	38,990
Norway	49	42,614	61	92,719	40	61,559	28	40,946	29	33,735	35	32,876
Russia	1	5,620	—	—	—	—	—	—	—	—	—	—
Spain	3	6,855	28	107,463	16	69,937	16	50,617	10	23,065	1	7,500
Sweden	18	18,400	67	110,765	33	78,269	18	43,356	19	43,159	21	57,930
Other Countries	19	23,829	29	68,703	62	55,784	51	74,338	40	31,470	23	31,987
World's Total	939	3,297,411	2067	7,680,663	1125	4,456,943	809	2,919,218	749	2,395,026	653	2,446,336

* The figures give the number and aggregate gross tonnage of steamers, motorships, and sailing vessels under construction on December 31st of each year.

† Excluding vessels building at ports on the Great Lakes of America.

ANNUAL MERCHANT SHIPPING LOSSES OF THE WORLD.*

	1913.			1919.			1921.			1922.			1923.			1924.		
	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No.	Tonnage.	% of Tonnage owned.	No	Tonnage.	% of Tonnage owned.
Gt. Brit. & Ireland	113	199,453	1·07	99	151,653	·92	74	72,104	·37	83	122,088	·63	88	140,335	·73	74	111,207	·58
British Dominions	37	20,091	1·16	89	52,539	2·56	82	58,687	2·35	43	20,602	·75	53	31,181	1·12	61	41,325	1·49
United States ‡ .	91	71,469	2·38	115	150,272	1·15	72	107,145	·73	72	94,387	·64	62	99,905	·68	64	87,418	·65
Austria-Hungary .	3	5,536	·55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Denmark . . .	13	6,583	·86	15	5,295	·75	13	8,386	·87	9	8,281	·80	10	8,071	·81	13	14,198	1·37
France	30	34,506	1·57	34	40,420	1·81	39	37,956	1·04	38	33,204	·86	38	18,011	·48	25	27,726	·79
Germany . . .	31	56,379	1·11	50	24,167	—	22	11,265	1·57	33	27,408	1·45	36	43,266	1·66	26	23,095	·78
Holland . . .	4	1,340	·10	23	11,550	·73	2	602	·03	7	5,167	·20	5	10,817	·41	1	801	·03
Italy	26	26,881	1·77	8	3,096	·23	27	33,090	1·25	27	33,908	1·18	32	55,702	1·82	16	38,810	1·37
Japan	25	25,514	†	38	41,418	†	29†	51,185†	1·53†	64†	54,136†	1·51†	33†	58,548†	1·62†	42†	70,933†	1·85 †
Norway . .	61	60,648	2·47	41	44,132	2·37	27	46,829	1·81	29	27,068	1·04	30	40,109	1·57	22	23,786	·95
Russia	29	23,894	2·45	4	4,771	·88	—	—	—	—	—	—	—	—	—	—	—	—
Spain	13	15,928	1·89	16	9,752	1·30	35	55,560	4·77	25	29,741	2·30	13	11,862	·94	10	10,181	·82
Sweden	30	17,327	1·65	38	29,021	2·92	13	11,854	1·02	12	7,304	·65	27	14,645	1·21	16	16,627	1·33
Other Countries .	36	42,686	—	65	54,719	—	68	86,163	—	63	33,417	—	39	44,120	—	52	65,438	—
World's Total .	542	608,235	—	635	622,805	—	503	580,826	--	505	516,711	—	466	576,572	—	422	531,545	—

* Figures refer to steam, motor, and sailing vessels of 100 gross tons and over totally lost, condemned, etc. The tonnage given is gross for steamers and motorships, and net for sailing ships up to and including the returns for 1919 ; in subsequent returns the tonnage is gross for steamers, motorships, and sailing ships.

† Japanese sailing vessels not included.

‡ Excluding ships trading on the Great Lakes of America.

"LAID-UP" STEAM TONNAGE OF PRINCIPAL MARITIME COUNTRIES.

	Jan. 1st, 1922.	July 1st, 1922.	Jan. 1st, 1923.	July 1st, 1923.	Jan. 1st, 1924.	July 1st, 1924.	Jan. 1st, 1925.	July 1st, 1925.
	Gross tnage.	Gross tnage.	Grosstnge.	Gross tnge.	Gross tnage.	Gross tnge.	Gross tnage.	Gross tnage.
Gt. Brit. & Ireland	1,769,000	1,667,000	1,010,000	1,064,000	909,000	700,000	705,000	1,130,000
Australia . . .	50,249	100,000*	106,000	216,075	85,000*	87,000	166,000	175,000*
United States :—								
Shipping Board .	4,314,000	3,978,000	4,411,000	3,771,000	3,564,000	3,812,000	3,664,000	3,767,000
Ship. Bd. Tankers	214,000*	214,000*	214,000	266,000	163,000	141,000	125,000	107,000
Govt. owned, other than U.S. S. Bd.	†	†	†	70,000	3,000	‡	17,000	13,000
Privately owned .	781,000	523,000	703,000	468,000	541,000	312,000	417,000	366,000
U.S. total .	5,309,000	4,715,000	5,328,000	4,575,000	4,271,000	4,265,000	4,223,000	4,253,000
Belgium . . .	275,000*	275,000*	170,000	161,000	86,000	35,000	26,000	68,000
Denmark . . .	161,000	33,000	17,000	7,000	13,000	—	—	18,000
France	1,085,000	1,200,000	730,000	725,000	450,000	317,000	311,000	219,000
Greece	170,000	48,000	76,000	94,000	122,000	91,000	24,000	99,000
Holland . . .	327,000	330,000	330,000	250,000	235,000	129,000	65,000	180,000
Italy	585,000*	585,000	472,000	559,000	427,000	252,000	225,000*	262,000
Japan	120,000	79,000	99,000	36,000	29,000	29,000	25,000	36,000
Norway . . .	207,000	112,000	53,000	75,000	50,000	23,000	25,000	51,000
Spain	530,000*	530,000*	520,000	241,000	128,000	98,000	60,000	73,000
Sweden . . .	204,000	114,000	22,000	—	—	—	20,000	40,000
Other Countries § .	192,000	—	195,000	39,000	83,000	99,000	103,000	149,000
World's total .	10,984,249	9,788,000	9,128,000	8,045,075	6,888,000	6,125,000	5,978,000	6,753,000

* Estimated. † No data available. ‡ Included in U.S. Shipping Board Figure.
§ Mainly belonging to countries shown above.

NOTE.—Prior to 1st January, 1922, no comprehensive information was collected, but the laying-up of tonnage became serious towards the close of 1920. The information available before 1st January, 1922, is summarised below :—

January, 1921.	United Kingdom (36 principal ports) :	614 vessels, of 940,564 net tons.
	United States of America . . . . :	2,000,000 d.w. tons (approx.).
	Scandinavian countries . . . . :	428 vessels, of 750,000 d.w. tons.
April, 1921.	United Kingdom (36 principal ports) :	1165 vessels, of 1,707,000 net tons.
	United States of America . . . . :	6,500,000 d.w. tons (approx.)
	Scandinavian Countries . . . . :	670 vessels, of 1,500,000 d.w. tons.
July, 1921.	United Kingdom (36 principal ports) :	883 British vessels, of 1,650,788 net tons.
		140 Foreign ,, 201,624 ,,
	Total :	1023 ,, 1,852,412 ,,
October, 1921.	United Kingdom (36 principal ports) :	654 British vessels, of 1,158,425 net tons.
		88 Foreign ,, 137,811 ,,
	Total :	742 ,, 1,296,236 ,,

NUMBERS OF VESSELS CLASSED BY VARIOUS CLASSIFICATION SOCIETIES.*

Society.	1913.	1919.	1921.	1922.	1923.	1924.	1925.
Lloyd's Register	10,466	9175	10,154	10,361	10,296	10,05	9973
British Corporation	876	1002	1190	1341	1306	1234	1253
American Bureau of Shipping — Record of American and Foreign Shipping .	846	926	2216	2565	2392	2226	2131
American Bureau of Shipping — Gt. Lakes Register . .	572	442	392	382	416	382	383
Bureau Veritas	5165	5706	6387	6521	4998	4903	5135
Norske Veritas	1504	955	1109	1217	1242	1244	1220
Registro Italiano	1442	699	1280	1987	1872	1901	1826
Germanischer Lloyd	2848	—‡	2219	—‡	2799	2894	2855
Veritas Adriatico	1146	516	471	†	†	†	†

* Many vessels, of course, are not exclusively classed in one Register.
† The Veritas Adriatico is now amalgamated with the Registro Italiano.
‡ No data available.

LARGEST STEAMERS OF THE WORLD.

Gross Tonnage.	Name.	Speed (knots).	Built.	Flag.	Owners.	Registered Dimensions.* Length.	Breadth.	Depth.
						ft.	ft.	ft.
59,957	Leviathan (*ex*-Vaterland)	23	1914	United States	U.S. Shipping Board	907·6	100·3	58·2
56,551	Majestic (*ex*-Bismarck)	25	1921	British	White Star	915·5	100·1	58·2
52,226	Berengaria (*ex*-Imperator)	23	1912	British	Cunard	883·6	98·3	57·1
46,439	Olympic	22	1911	British	White Star	852·5	92·5	59·5
45,647	Aquitania	23	1914	British	Cunard	868·7	97·0	49·7
34,569	Paris	22	1921	French	Cie. Gén. Transatlantique	735·4	85·3	59·1
34,351	Homeric (*ex*-Columbus)	20	1922	British	White Star	751·0	83·3	48·6
32,354	Columbus	20	1922	German	Norddeutscher Lloyd	749·6	83·1	49·4
30,696	Mauretania	26	1907	British	Cunard	762·2	88·0	57·1
27,132	Belgenland	17½	1917	British	International Nav. Co., Ltd.	670·4	78·4	44·7
25,128	Empress of Scotland (*ex*-Kaiserin Auguste Victoria)	17½	1905	British	Canadian Pacific Steamships, Ltd.	677·5	77·3	50·2
24,541	Adriatic	18	1906	British	White Star	709·2	75·5	52·6
24,281	Duilio	21	1923	Italian	Nav. Gen. Italiana	602·4	76·3	46·3
24,149	Rotterdam	17	1908	Dutch	Nederl. Amerik. Stoomv. Maats.	650·5	77·4	43·5
23,884	Baltic	17	1904	British	White Star	709·2	75·6	52·6
23,788	George Washington	18	1908	United States	U.S. Shipping Board	699·1	78·2	50·1
23,769	France	24	1912	French	Cie. Gén. Transatlantique	690·1	75·6	48·5
21,998	Minnetonka	16½	1924	British	Atlantic Transport Co., Ltd.	600·8	80·4	49·4
21,861	Empress of Australia (*ex*-Tirpitz)	17	1914	British	Canadian Pacific Steamships, Ltd.	589·9	75·2	41·5
21,716	Minnewaska	16½	1923	British	Atlantic Transport Co., Ltd.	600·8	80·4	49·4
21,657	Giulio Cesare	20	1921	Italian	Nav. Gen. Italiana	602·4	76·5	46·3
21,517	Empress of Canada	20	1922	British	Canadian Pacific Steamships, Ltd.	627·0	77·9	42·2
21,144	America	17	1905	United States	U.S. Shipping Board	668·8	74·3	47·8
21,073	Cedric	17	1903	British	White Star	680·9	75·3	44·1
21,026	Celtic	17	1901	British	,, ,,	680·9	75·3	44·1
20,847	Mooltan	17	1923	British	P. & O. Steam Navigation Co., Ltd.	600·8	73·4	48·6
20,837	Maloja	17	1923	British	,, ,, ,,	600·8	73·4	48·6
20,815	Albert Ballin	16	1923	German	Hamburg-Amerika Linie	602·4	78·7	41·9
20,602	Deutschland	16	1923	German	,, ,,	602·5	78·7	51·6
20,576	Cap Polonio	18	1914	German	Hamburg Sudamerikanische Dampfs. Ges.	637·8	72·4	39·5
20,158	Franconia	17	1923	British	Cunard	601·3	73·7	40·6
20,001	Oronsay	20	1925	British	Orient Steam Navigation Co., Ltd.	633·6	75·2	33·0
20,000	Otranto	20	1925	British	,, ,, ,,	632·0	75·3	33·0

* The registered dimensions are measured as follows: Length from fore part of stem at extreme top to aft side of head of stern post, or centre of rudder stock if a balanced rudder is fitted; breadth is taken to outside of plating; depth from top of beam at centre line of tonnage deck amidships to ceiling. If there is no ceiling it is measured to the tank top. If there are more than two decks, the tonnage deck is the second deck, counting from below.

FASTEST STEAMERS OF THE WORLD.†

Speed (knots).	Name.	Gross Tonnage.	Date built.	Flag.	Owners.	L.* (ft.).	B.* (ft.).	D.* (ft.).
26	Mauretania	30,696	1907	British	Cunard	762·2	88·0	57·1
25 and under 26	Majestic	56,551	1921	,,	White Star	915·5	100·1	58·2
	Versailles	1,903	1919	French	Chemins de Fer de l'État Français and the Southern Rly.	300·6	34·6	21·4
24 and under 25	Anglia	3,460	1920	British	London, Midland & Scottish Rly.	380·5	45·2	17·2
	Cambria	3,445	1921	,,	,,	380·6	45·2	17·2
	Hibernia	3,458	1920	,,	,,	380·6	45·2	17·2
	Scotia	3,441	1921	,,	,,	380·5	45·2	26·2
	France	23,769	1912	French	Cie. Gén. Transatlantique	690·1	75·6	48·5
23 and under 24	Aquitania	45,647	1914	British	Cunard	868·7	97·0	49·7
	Berengaria	52,226	1912	,,	,,	883·6	98·3	57·1
	Biarritz	2,053	1915	,,	Southern Rly.	341·2	42·1	24·0
	Engadine	1,676	1911	,,	,,	316·0	41·1	15·8
	Maid of Orleans	2,071	1918	,,	,,	341·1	42·1	16·0
	Paris	1,774	1913	,,	,,	293·5	35·6	15·2
	Riviera	1,675	1911	,,	,,	316·0	41·1	15·8
	Viking	1,957	1905	,,	Isle of Man Stm. Packet Co.	350·4	42·0	16·1
	H. F. Alexander	8,357	1914	U.S.	Admiral Line	509·5	63·1	21·0
	Leviathan	59,957	1914	,,	U.S. Shipping Board	907·6	100·3	58·2
22 and under 23	Manxman	2,030	1904	British	Isle of Man Stm. Packet Co.	334·0	43·1	17·3
	Mona's Isle	1,688	1905	,,	,,	311·2	40·1	15·8
	Olympic	46,439	1911	,,	White Star	852·5	92·5	59·5
	St. Andrew	2,495	1908	,,	Fishguard and Rosslare Railways and Harbours Co.	351·1	41·1	16·5
	St. David	2,457	1906	,,	,,	350·8	41·1	16·5
	St. Patrick	2,456	1906	,,	,,	350·8	41·1	16·5
	Snaefell	1,713	1906	,,	Isle of Man Stm. Packet Co.	315·0	39·6	15·7
	Victoria	1,689	1907	,,	Southern Rly.	311·0	40·1	15·8
	Wahine	4,436	1913	,,	Union S.S. Co. of New Zealand, Ltd.	375·0	52·2	25·6
	Paris	34,569	1921	French	Cie. Gén. Transatlantique	735·4	85·3	59·1
	Mecklenburg	2,907	1922	Dutch	Stoomv. Maats. "Zeeland"	350·4	42·7	23·9
	Oranje Nassau	2,885	1909	,,	,,	350·0	42·7	16·4
	Prinses Juliana	2,908	1920	,,	,,	350·4	42·7	23·9
21 and under 22	Antwerp	2,957	1920	British	London and North Eastern Rly.	321·6	43·1	17·9
	Bruges	2,949	1920	,,	,,	321·6	43·1	17·9
	King Orry	1,877	1913	,,	Isle of Man Stm. Packet Co.	300·0	43·1	15·9
	Malines	2,969	1921	,,	London and North Eastern Rly.	320·7	43·2	25·7
	Princess Kathleen	5,875	1925	,,	Canadian Pacific Rly. Co.	350·1	60·1	17·1
	Princess Marguerite	5,875	1925	,,	,,	350·1	60·1	17·1
	La Savoie	11,168	1900	French	Cie. Gén. Transatlantique	563·1	60·0	35·9
	Rouen	1,656	1912	,,	Chemins de Fer de l'Etat Français and the Southern Rly.	292·0	34·6	22·1
	Duilio	24,281	1923	Italian	Nav. Gen. Italiana	602·4	76·3	46·3
	Esperia	11,346	1918	,,	Soc. Italiana di Servizi Marittimi	492·1	61·7	34·1
	Venezia	988	1906	,,	D. Tripcovich	275·0	32·1	10·2
20 and under 21	Britannia	459	1896	British	P. and A. Campbell, Ltd.	230·0	26·6	9·6
	Cambria	420	1895	,,	,,	225·0	26·1	9·4
	Curraghmore	1,587	1919	,,	London, Midland and Scottish Rly.	307·1	40·1	14·5
	Devonia	623	1905	,,	P. and A. Campbell, Ltd.	245·0	29·0	9·7
	Empress of Asia	16,909	1913	,,	Canadian Pacific Steamships, Ltd.	570·1	68·2	42·0
	Empress of Canada	21,517	1922	,,	,,	627·0	77·9	42·2
	Empress of Russia	16,810	1913	,,	,	570·2	68·2	42·0
	Homeric	34,351	1922	,,	White Star	751·0	83·3	48·6

* Registered dimensions; see note on p. 513.
† The speeds used in compiling this table are as given by the owners. Motorships are included.

FASTEST STEAMERS OF THE WORLD†—*continued.*

Speed (knots).	Name.	Gross Tonnage.	Date built.	Flag.	Owners.	L.* (ft.).	B.* (ft.)	D.* (ft.).
20 and under 21	Lady Moyra	519	1905	British	P. and A. Campbell, Ltd.	245·0	29·0	9·7
	Loongana	2,448	1904	,,	Tasmanian Steamers Pty., Ltd.	300·3	43·1	23·3
	Manx Maid	1,512	1910	,,	Isle of Man Stm.PacketCo.	284·6	39·1	15·8
	Maori	3,488	1907	,,	Tasmanian Steamers Pty., Ltd.	350·5	47·2	24·7
	Nairana	3,042	1917	,,	,,	315·8	45·6	23·6
	Orama	19,777	1924	,,	Orient Steam Nav.Co., Ltd.	632·0	75·2	32·9
	Oronsay	20,001	1925	,,	,,	633·6	75·2	33·0
	Otranto	20,000	1925	,,	,,	632·0	75·3	33·0
	Queen Alexandra	785	1912	,,	J. Williamson & Co.	270·3	32·1	11·0
	St. George	2,676	1906	,,	London & North Eastern Rly.	352·0	41·1	16·2
	Westward Ho	438	1894	,,	P. and A. Campbell, Ltd.	225·0	26·1	9·5
	Jan Breydel	1,767	1909	Belgian	Belgian Government	348·0	40·0	23·2
	Pieter de Coninck	1,767	1910	,,	,,	348·0	40·0	23·2
	Princesse Elisabeth	1,747	1905	,,	,,	357·0	40·0	23·2
	Princesse Marie José	1,821	1922	,,	,,	348·0	40·0	23·3
	Stad Antwerpen	1,384	1913	,,	,,	300·0	36·0	22·9
	Ville de Liège	1,384	1913	,,	,,	300·0	36·0	22·9
	Charles Roux	4,104	1908	French	Cie. Gén. Transatlantique	385·5	45·6	26·1
	Lutetia	14,654	1913	,,	Cie. de Nav. Sud Atlantique	579·0	64·1	36·7
	Massilia	15,147	1920	,,	,,	577·1	4·1	37·0
	Newhaven	1,656	1911	,,	Chemins de Fer de l'État Français and the Southern Rly.	292·0	34·6	22·1
	Columbus	32,354	1922	German	Norddeutscher Lloyd	749·6	83·1	49·4
	Città di Catania	3,397	1910	Italian	Italian State Rlys.	363·5	42·1	18·8
	Città di Siracusa	3,497	1910	,,	,,	363·5	42·1	18·5
	Conte Rosso	17,048	1922	,,	Lloyd Sabaudo	570·2	74·2	35·9
	Conte Verde	18,765	1923	,,	,, ,,	570·2	74·2	35·9
	Giulio Cesare	21,657	1921	,,	Nav. Gen. Italiana	602·4	76·5	46·3
	Nagasaki Maru	5,268	1922	Japanese	Nippon Yusen Kabushiki Kaisha	395·0	54·2	29·0
	Shanghai Maru	5,259	1923	,,	,,	395·0	54·2	29·0
	Agamemnon	19,361	1902	U.S.	U.S. Shipping Board	684·3	72·3	40·2
	Mount Vernon	18,372	1906	,,	,,	685·4	72·2	40·5
	Northland	2,055	1911	,,	Norfolk and Washington Steamboat Co.	291·2	51·0	18·0
	Southland	2,081	1908	,,	,,	291·2	51·0	16·1
	Tacoma	836	1913	,,	Puget Sound Nav. Co.	209·4	30·0	17·6

* Registered dimensions; see note on p. 513.

NUMBERS OF MERCHANT VESSELS OF VARIOUS SPEEDS.†

Speed.	Number. 1910.	1922.	1923.	1924.	1925.	Speed.	Number. 1910.	1922.	1923	1924.	1925.
25 knots and over	—	8	4	4	3	16½ knots	45	44	49	53	43
24 ,, and under 25	—	9	8	7	5	16 ,,	126	131	134	132	147
23 ,, ,, 24	—	5	8	8	10	15½ ,,	47	35	44	45	55
22 ,, ,, 23	—	17	19	16	13	15 ,,	215	185	197	201	182
21 ,, ,, 22	—	20	7	9	11	14½ ,,	85	81	85	102	100
20 ,, ,, 21	105*	32	36	39	42	14 ,,	276	289	306	319	322
19 ,, ,, 20	42	26	23	19	25	13½ ,,	138	170	162	172	169
18½ knots	24	18	20	16	23	13 ,,	462	458	466	461	441
18 ,,	60	54	53	55	54	12½ ,,	206	153	172	195	186
17½ ,,	48	36	35	34	30	12 ,,	732	790	848	853	859
17 ,,	83	88	124	120	121						

* This figure includes all merchant steamers of 20 knots and over in existence in 1910.
† The speeds used in compiling these tables are as given by the owners.

GENERAL PARTICULARS OF LARGE SHIPS OF VARIOUS NATIONALITIES.

Name of Ship	AQUITANIA.	MAURETANIA.	OLYMPIC.	LEVIATHAN (formerly Vaterland).	BERENGARIA (formerly Imperator).	MAJESTIC (formerly Bismarck).
Name of Builders	John Brown & Co., Ltd., Clydebank	Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne	Harland & Wolff, Ltd., Belfast	Blohm & Voss, Hamburg	Vulcan Co., Hamburg	Blohm & Voss, Hamburg.
Name of Owners or Managers	Cunard Co.	Cunard Co.	White Star Line	U.S. Shipping Board	Cunard Co.	White Star Line
Year when built	1914	1907	1911	1914	1912	1921
Length over all	901 ft. 6 ins.	790 ft.	883 ft.	950 ft.	905 ft.	956 ft.
Length between perpendiculars (or moulded)	865 ft. 8 ins.	760 ft.	850 ft.	—	880 ft.	912 ft.
Breadth	97 ft.	88 ft.	92 ft. 6 ins,	100 ft. 3¼ ins.	98 ft. 3½ ins.	100 ft.
Depth (moulded)	54 ft. 6 ins.	60 ft. 9 ins.	64 ft. 3 ins.	63 ft.	62 ft.	64 ft.
Gross Tonnage	45,647	30,696	46,439	59,957	52,226	56,551
Draught	36 ft. 2 ins.	36 ft. 3 ins.	34 ft. 7 ins.	38 ft. 6 ins.	35 ft. 6 ins.	38 ft. 11¼ ins.
Displacement (tons)	51,700	41,590	—	63,100	57,000	64,000
Number of Passengers—						
First Class	597	602	817	672 †	700	1000
Second Class	614	430	510	535	600	545
Third Class	2000 (and 52 servants)	780	1216	2392 ‡	2690	2392
Machinery Makers	John Brown & Co., Ltd.	Wallsend Slipway and Engineering Co., Ltd.	Harland & Wolff, Ltd., Belfast	Blohm & Voss, Hamburg	Vulcan Co., Hamburg	Blohm & Voss, Hamburg
Type of Engines	Steam Turbines driving Four Screws	Steam Turbines driving Four Screws	Reciprocating with Turbine on Centre Shaft	Turbines	Steam Turbines driving Four Screws	Steam Turbines driving Four Screws
Number of Cranks	—	—	8	—	—	—
Diameters of Cylinders	—	—	Two 54 ins.; two 84 ins.; and four 97 ins.	—	—	—
Stroke of Pistons	—	—	75 ins.	—	—	—
Revolutions per Minute	180	200	Reciprocating engines, 77; Turbine, 165	180–190	185	180
Total Indicated or Shaft Horse-power	60,000	75,000	51,000	—	76,250	66,000
Number and Type of Boilers	21 Cylindrical (double ended)	25 Cylindrical (23 double-ended, 2 single-ended)	29 Cylindrical (24 double-ended, 5 single-ended)	46 Water Tube	46 Water Tube	48 Water Tube
Number of Furnaces	168 (now fitted for oil burning)	192 (now fitted for oil burning)	159 (now fitted for oil burning)	138 (now fitted for oil burning)	46 (oil-fired)	48 (oil-fired)
Steam Pressure (lb. per sq. in.)	195	195	215	235	228	260
Total Heating Surface (sq. ft.)	138,595	159,000	142,454	210,440	203,009	220,000
Total Grate Area (sq. ft.)	3541	4060	3428	3843	3768	4013
System of Draught	Howden's	Howden's	Natural	Howden's	Howden's	Forced
Speed on Service (knots)	23	25·5 *	22	23	23	25

* NOTE.—This figure is the mean speed attained for 27 consecutive runs across the North Atlantic in one year covering a total distance of 77,500 nautical miles. The highest mean speed from Queenstown to New York was 26·25 knots; see page 517.

† 80 Berths for Servants and 110 Pullman Berths in addition.

‡ Including 1542 Fourth Class Passengers.

PARTICULARS OF FASTEST VOYAGES ON PRINCIPAL PASSENGER SERVICES.

Name of Vessel.	Owners.	Date of Voyage.	Ports between which Voyage was made.	Total distance (Sea miles).	Time taken.	Average speed (Knots).	Best day's run (Knots).	Remarks.
Mauretania . .	Cunard Steam Ship Co., Ltd.	Sept., 1910	Liverpool and New York	2,780*	4 days, 10 hours, 41 mins.	26·06	—	* The distance given is between Daunts Rock and Sandy Hook Lightship, the points between which the time was taken. On a voyage in January, 1911, the Mauretania attained a speed of 27·04 knots for one day, and the best day's run on the same voyage was 676 knots.
,,	,, ,,	Aug., 1924	New York and Cherbourg	3,198§	5 days, 1 hour, 49 mins.	26·25	—	
Majestic . . .	White Star Line	Sept., 1923	New York and Southampton *via* Cherbourg	3,104 (ocean passage)	5 days, 5 hours, 21 mins.	24·76	613	
Empress of France	Canadian Pacific Steamships, Ltd.	July 17–24, 1924	Southampton and Quebec	2,640	5 days, 8 hours, 51 mins.	20·49	—	
China	Peninsular and Oriental Steam Navigation Co.	Sept. 26 to Oct. 14, 1919	London and Bombay	6,258	17 days, 20 hours.†	15·7	—	
Orcoma . . .	Pacific Steam Navigation Co.	Feb. 22 to May 7, 1923	Liverpool, Valparaiso, Liverpool, *via* Panama Canal	18,627	73 days, 8 hours (actual steaming 55 d. 8½ h.)	14·0	371	§ The distance given is between Ambrose Channel Light Vessel and Cherbourg Breakwater.
Paris	Southern Railway and French State Railway	July 14, 1913	Newhaven and Dieppe	65	2 hours, 35 mins., 37 secs.	25·07	—	† Record sea transit to Bombay, but not record speed as vessel did not have to deviate to Marseilles.
Maid of Orleans .	Southern Railway	April 25 & 28, 1922	Dover and Calais	20	50 mins.	24·0	—	
St. George . .	Gt. Western Railway ‡	July 6, 1910	Fishguard and Rosslare	54	2 hours, 28 mins.	21·9	—	‡ Now owned by the London and North Eastern Railway.
Lorina	Southern Railway	Sept. 4, 1920	Jersey and Southampton	130	6 hours, 34 mins.	19·8	—	

PAY IN THE MERCHANT SERVICE.—Monthly Rates.

*Foreign-going Cargo Steamers.**

Rating.	1914.	1924 †	1925. ‡
	£ s. £ s.	£ s. £ s.	£ s. £ s.
First Mates	12 5 to 14 5	17 10 to 26 10	16 0 to 25 0
Second Mates	9 5 ,, 12 15	15 0 ,, 18 10	13 10 ,, 17 0
Third Mates	7 10 ,, 10 10	13 0 ,, 14 0	11 10 ,, 12 10
Chief Engineers	16 15 ,, 24 0	21 10 ,, 34 10	20 0 ,, 33 0
Second Engineers	12 5 ,, 14 15	17 10 ,, 26 10	16 0 ,, 25 0
Third Engineers.	8 15 ,, 11 15	15 0 ,, 18 10	13 10 ,, 17 0
Carpenters	7 0 ,, 7 10	12 10 ,, 14 10	11 10 ,, 13 10
Boatswains	6 5 ,, 6 10	11 10 (Fixed rate.)	10 10 (Fixed rate.)
Firemen	5 10 ,, 6 0	10 10 ,,	9 10 ..
Able Seamen	5 0 ,, 5 10	10 0 ,,	9 0 ,,

* On Oil-Tank Vessels, the 1924 and 1925 rates are supplemented by the following percentage additions:—

Chief Engineers . . . . 12½ per cent.
First Mates and Second Engineers . . . . . . 10 ,,
Other Mates and Engineers . . . . 7½ ,,

On Motor Vessels there is a special National Standard Scale of Pay for Engineer Officers substantially higher than on steam-driven vessels.

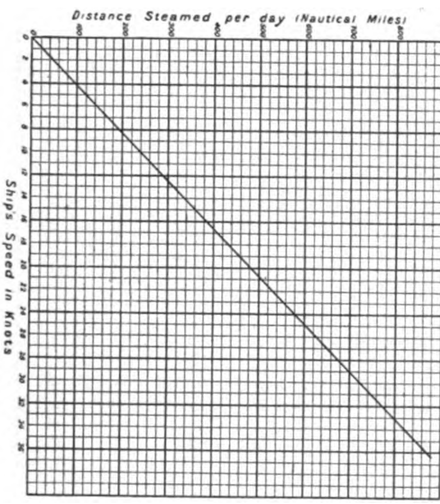
† The 1924 figures are the National Maritime Board standard rates of pay, effective from September 5, 1924, and based, in the case of Navigating and Engineer Officers, on tonnage and seniority.

‡ National Maritime Board standard rates effective from August 1st, 1925.

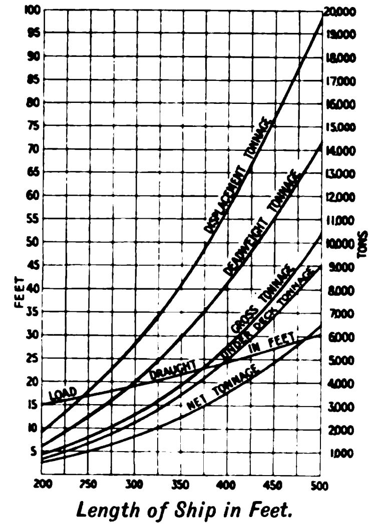
On Passenger Liners, Navigating and Engineer Officers, as a rule, receive now, as before the War, wages from 10 to 25 per cent. higher than the Standard Cargo-Vessel rates.

IMPORTANT DATES IN THE DEVELOPMENT OF MARINE PROPELLING MACHINERY.

—	Approximate Date of Introduction in the United Kingdom.			
	Merchant.		Naval.	
Compound engines	—	1860	—	1865
Triple-expansion engines	—	1880	—	1885
Quadruple-expansion engines	—	1890	Not fitted	—
Cylindrical boilers	—	1862	—	1869
Water-tube boilers	Cross-channel	1911	Destroyers	1893
	Ocean liners	1914	Battleships	1897
Direct turbines	Cross-channel	1901	Destroyers	1898
	Ocean liners	1905	Light cruisers	1904
			Battleships	1906
Combination engines and turbines	Intermediate liner	1908	(For cruising only)	1902
Geared turbines	Single-reduction	1911	Single-reduction	1913
	Double-reduction	1916	Not fitted	—
Electric propulsion	First attempts	1904	Not fitted	—
	Modern plant	1912	—	—
Oil fuel burning	First attempts	1870	Coal and oil—	
			Destroyers	1902
			Battleships	1904
	Modern plant	1892	Oil alone—	
			Destroyers	1910
			Battleships	1913
Heavy oil engines	First attempts	1904	Tender	1914
	Modern plant	1910	Submarines	1908
	Double-acting	1924	—	—



DISTANCE STEAMED IN ONE DAY BY SHIPS OF DIFFERENT SPEEDS.

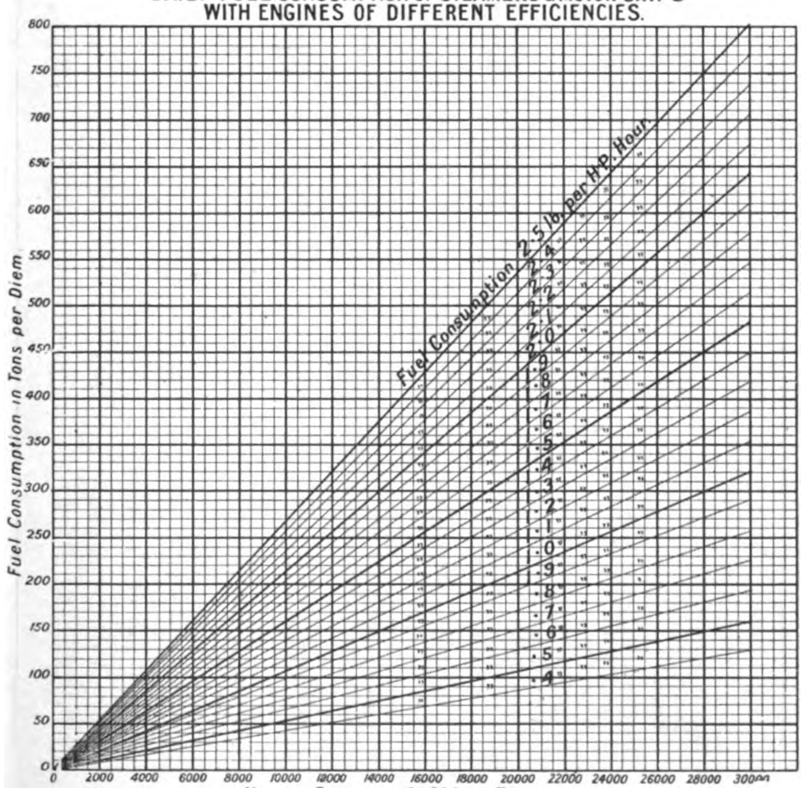


AVERAGE RELATION BETWEEN TONNAGE AND LENGTH.*

* For modern steamers of the Full-Scantling Three-Island Type with 50 per cent. erections, proportions vary from $L/D = 12{\cdot}5$ and $B/D = 1{\cdot}8$ in the 200 ft. ship to $L/D = 13{\cdot}0$ and $B/D = 1{\cdot}65$ in the 500 ft. ship.

* (Reprinted by permission from a paper on "Tonnage Legislation and its Application to the Measurement of Ships," by E. W. Blockridge, M.I.N.A.)

DAILY FUEL CONSUMPTION OF STEAMERS & MOTOR SHIPS WITH ENGINES OF DIFFERENT EFFICIENCIES.



PROGRESS IN MARINE MACHINERY—ATLANTIC LINERS.

	1881.	1888.	1893.	1899.	1907.	1914.	1921.
Ship Dimensions—							
Length	500′ 0″	528′ 0″	600′ 0″	685′ 0″	760′ 0″	865′ 0″	912′ 0″
Beam	50′ 0″	63′ 0″	65′ 0″	68′ 5″	87′ 6″	96′ 6″	100′ 0″
Performance—							
Speed in Knots	18·0	20·1	22·0	20·7	26·0	23·5	23·5
Horse Power	10,680	18,500	30,000	27,000	72,500	60,000	66,000
Engines—							
No. of Propellers	One	Two	Two	Two	Four	Four	Four
Type of Machinery	Vertical Compound	Vertical Triple Expansion	Vertical Triple Expansion	Vertical Triple Expansion	Steam Turbines	Steam Turbines	Steam Turbines.
Cylinders on each shaft	68″, 100″, 100″ by 72″ stroke	45″, 71″, 113″ by 60″ stroke	37″, 37″, 79″, 98″, 98″ by 69″ stroke	47½″, 79″, 93″, 93″ by 72″ stroke	—	—	—
Revolutions of Propeller	64·2	86	81	78	180	180	180
Piston Speed (f.p.m.)	770	860	930	936	—	—	—
Referred M.P. (lb. per sq. in.)	29·1	35·3	35	35	—	—	—
Boilers—							
No. and type	— Cylindrical	9 double-ended Cylindrical	12 double-ended Cylindrical	15 double-ended Cylindrical	23 double-ended & 2 single-ended Cylindrical	21 double-ended Cylindrical	48 Water-tube (oil-fired)
Working-pressure (lb. per sq. in.)	100	150	165	192	195	195	260
System of Draught	Natural Draught	Closed Stokehold	Natural Draught	Assisted Draught	Howden's	Howden's	Forced
Heating Surface per H.P.	3·3 sq. ft.	2·75 sq. ft.	2·73 sq. ft.	2·77 sq. ft.	2·19 sq. ft.	2·31 sq. ft.	3·33 sq. ft.
H.P. per sq. ft. of grate	8·57	14·3	11·4	13·75	17·9	16·9	16·4
Total Weight of Machinery "Steam up"	1860 tons	2516 tons	4935 tons	4414 tons	9936 tons	9302 tons	—
H.P. per ton of Machinery	5·74	7·4	6·1	6·1	7·3	6·5	—
Coal Consumption per H.P. hour	—	1·7 lbs.	1·6 lbs.	—	1·4 lbs.	1·3 lbs.	—

PROGRESS IN MARINE MACHINERY—INTERMEDIATE OCEAN LINERS.*

Year	1880.	1892.	1911.	1914.	1920.
Ship dimensions—					
Length	400 ft.	470 ft.	520 ft.	550 ft.	550 ft.
Beam	45 ft.	53 ft.	64 ft.	66 ft. 6 ins.	66 ft.
Performance—					
Speed in knots	12·5	12·5	14·5	16·5	17
Horse-power	3,000 I.H.P.	3,500 I.H.P.	7,500 I.H.P.	11,000 S.H.P.	11,000 S.H.P.
Engines—					
No. of propellers	One	Two	Two	Two	Two
Type of machinery . . .	Vertical compound	Vertical triple-expansion	Vertical quadruple expansion	Geared steam turbines	Geared steam turbines
Dimensions of cylinders . .	52-in., 96-in. by 66-in.	22½-in., 36½-in., 60-in. by 48-in.	26-in., 37-in., 53-in., 76-in. by 54-in.	Two H.P. and two L.P. turbines with single-reduction-gearing	Two H.P. and two L.P. turbines with double-reduction-gearing
Propeller (revs. per min.) .	61	80	82	133	85
Piston speed (feet per min.)	671	640	738	Turbine revs. 1,650	H.P. turbine, revs. 3,200; L.P. turbine, revs. 2,000
Referred mean pressure . .	20·5	32·0	37	—	—
Condenser surface per H.P. .	1·85	1·6	0·84	0·80	0·62
Boilers—					
No. and type	Two cylindrical	Two D.E. and one S.E. cylindrical	Five double-ended cylindrical	Five double-ended cylindrical	Five water-tube boilers, burning oil fuel (with superheaters)
Working pressure (lb. per sq. in.)	90	170	210	210	250
System of draught . . .	Natural	Natural	Natural	Howden's forced draught	Oil-burning with forced draught
Heating surface per H.P. .	3·1 sq. ft.	3·3 sq. ft.	3·25 sq. ft.	2·5 sq. ft.	2·25 sq. ft.
H.P. per sq. feet of grate .	7·6	10·0	11·75	17·5	—
Total weight of machinery "Steam up"	685 tons	795 tons	1,750 tons	1,800 tons	1,210 tons
H.P. per ton of machinery . .	4·35	4·4	4·25	6·1	9·1
Coal consumption per H.P. hour	2·375 lb.	1·875 lb.	1·55 lb.	1·4 lb.	0·875 lb. (Oil).

* This and the two succeeding tables are from "Two Centuries of Shipbuilding by the Scotts at Greenock" (1920).

PROGRESS IN MARINE MACHINERY—CARGO STEAMERS.

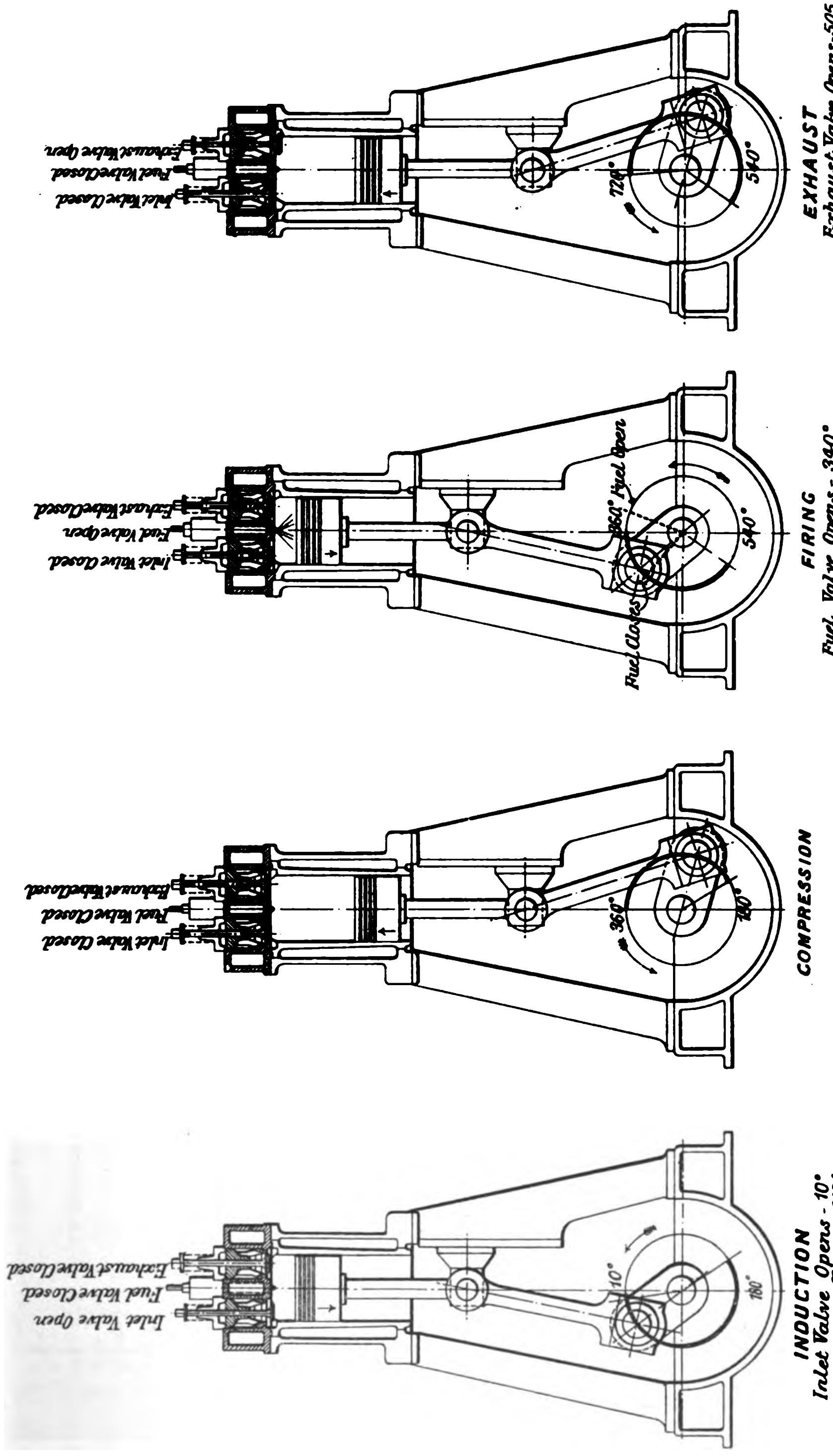
Year	1877.	1885.	1911.	1914.	1920.
Ship dimensions—					
Length	314 ft.	320 ft.	440 ft.	450 ft.	503 ft.
Beam	35 ft.	38 ft.	52 ft. 6 in.	56 ft.	63 ft.
Performance—					
Speed in knots	11·25	12·25	13·25	14·25	14·25
Horse-power	775 I.H.P.	1,650 I.H.P.	4,200 I.H.P.	4,000–5,000 S.H.P.	7,000 S.H.P.
Engines—					
No. of propellers	One	One	One	One	Two
Type of machinery	Tandem compound with flywheel	Triple-expansion	Triple-expansion	Steam turbines and single-reduction gearing; one H.P. and one L.P. turbine	Steam turbines and double-reduction gearing; two H.P. and two L.P. turbines
Propeller (revs. per min.)	52	70	73	102	80
Piston speed (feet per min.)	450	560	750	1,350 revs. of turbines	H.P. turbines, 3,500 revs.; L.P. turbines, 2,500 revs
Referred mean pressure	23	31·5	35	—	—
Condenser surface per H.P.	2·17	1·83	1·5	1·18	1·12
Boilers—					
No. and type	One-Oval ends and round middle portion	Two cylindrical	Two main cylindrical	Two cylindrical	Three cylindrical oil-fired boilers with superheaters
Working pressure (lb. per sq. in.)	70	150	190	195	200
System of draught	Natural	Natural	Forced draught	Howden's forced draught	Oil-burning with forced draught
Heating surface per H.P. (sq. ft.)	4·46	2·82	2·8	2·30	2·25
H.P. per sq. ft. of grate	7·6	10·4	16·25	20·0	—
Weights—					
Weight of machinery	200	340	900	930	1,100
H.P. per ton of machinery	3·87	4·85	4·67	6·45	6·35
Coal consumption per H.P. hour	About 2·5 lb.	1·95 lb.	1·65 lb.	1·45 lb.	0·85 lb. (Oil)

PROGRESS IN MARINE MACHINERY—CROSS-CHANNEL STEAMERS.

Year	1890.	1898.	1904.	1910.	1920.
Ship dimensions—					
Length	300 ft.	315 ft.	330 ft.	316 ft.	302 ft.
Beam	34 ft. 6 in.	37 ft.	42 ft.	41 ft.	35 ft. 6 in.
Performance—					
Speed in knots	18	19·75	19·5	21·5	23·5
Horse-power	4,400 I.H.P.	5,520 I.H.P.	5,500 S.H.P.	8,500 S.H.P.	12,300 S.H.P.
Engines—					
No. of propellers	Two	Two	Three	Three	Two
Type of machinery	Three-cylinder triple-expansion	Four-cylinder triple-expansion	Direct steam turbines, one H.P. and two L.P.	Direct steam turbines, one H.P. and two L.P.	Geared steam turbines, two H.P. and two L.P.
Propeller (revs. per min.)	130	165	550	625	435
Piston speed (feet per min.)	780	910	Turbines, 550 revs.	Turbines, 625 revs.	H.P. turbine, 2,600 revs.; L.P. turbine, 1,800 revs.
Referred mean pressure	30·75	43·0	—	—	—
Condenser surface per H.P.	1·42	1·4	1·35	0·75	0·6
Boilers—					
No. and type	Five S.E. cylindrical	Four S.E. cylindrical	Two D.E. and one S.E. cylindrical	Seven water-tube	Eight water-tube
Working pressure (lb. per sq. in.)	160	180	150	190	195
System of draught	Natural	Forced	Forced	Forced	Forced
Heating surface per H.P. (sq. ft.)	2·6	1·95	1·9	1·95	2
H.P. per sq. ft. of grate	12·25	17·5	16·5	15·0	22·0
Total weight of machinery—					
Steam up	590 tons	610 tons	590 tons	735 tons	1,055 tons
H.P. per ton of machinery	7·45	9·62	9·3	11·6	11·65
Coal consumption per H.P. hour	2·25 lb.	2·1 lb.	1·8 lb.	1·7 lb.	1·50 lb.

PROGRESS IN MARINE MACHINERY—MOTOR SHIPS.

	1909.	1910.	1912.	1914.	1916.	1922.	1924.
Ship Dimensions—							
Length	210 ft.	260 ft.	380 ft.	425 ft.	450 ft.	502 ft.	580 ft.
Beam	38 ft.	43 ft.	53 ft.	55 ft.	57 ft.	62 ft.	72 ft.
Performance—							
Speed	8½ knots	10½ knots	11 knots	11¼ knots	12 knots	13½ knots	18½ knots
Indicated horse-power . . .	490	1,460	2,500	3,100	4,000	6,400	17,500
Engines—							
No. of propellers	1	1	2	2	2	2	4
Type of engine	4-cycle single acting	4-cycle single acting	4-cycle single acting	4-cycle single acting	4-cycle single acting	4-cycle single acting	2-cycle single acting
Cylinders per shaft	6	6	8	6	6	8	6
Bore	15¾ in.	22 in.	20⅞ in.	24⅞ in.	29⅛ in.	29⅛ in.	27½ in.
Stroke	23⅝ in.	39⅜ in.	28¾ in.	37⅞ in.	43 5/16 in.	45¼ in.	39 in.
Revolutions per minute. . .	140	125	140	125	100	115	135
Piston speed in feet per minute	550	820	670	785	725	865	880
Mean pressure, lbs. per sq. in.							
I.H.P. basis	99	111	89·8	89·5	91	91·5	93·0
B.H.P. basis	75	83	68	67	68	69	68·5
Type of Auxiliaries	Steam	Steam	Electric	Electric	Electric	Electric	Steam
Total weight of machinery . .	91 tons	220 tons	390 tons	475 tons	600 tons	940 tons	2350 tons
B.H.P. per ton of machinery .	4·3	5	4·8	4·9	5	5·1	—
Oil consumption for all purposes per B.H.P.-hour	0·6 lb.	0·5 lb.	0·47 lb.	0·45 lb.	0·45 lb	0·45 lb.	0·48 lb.



MARINE DIESEL ENGINE, FOUR-CYCLE TYPE, DIAGRAM OF OPERATIONS.

COMPARISONS OF STEAM AND OIL-ENGINED VESSELS.

The table given herewith of comparisons of the cost of operating steam and oil-engined vessels is the same as was given in last year's issue of "Brassey's Annual," page 550.

The savings consequent upon the installation of Diesel machinery compel attention. The relative positions occupied by vessels propelled by the various types of prime movers will be noted.

It is impossible in any such comparisons to take fully into account all the factors which may operate in the case of vessels trading on different routes, but it is hoped that the figures given herewith will indicate the nature of the relative costs.

The following savings, which are effected by the installation of Diesel machinery, have not been taken into account: less fuelling costs, demurrage, no stand-by losses, less cleaning ship, higher average speed in a seaway, reduced fuelling appliances required, etc.

	Diesel Engines.	Reciprocating Steam-Engines.		Turbines.
Type of propelling machinery.	4-cycle single-acting reversible, crosshead. Diesel electric-driven auxiliaries.	Triple-expansion engines, cylindrical boilers, Howden's forced draught, Superheat, 50° Fahr.		With reduction gearing, oil fired, Superheat, 150° Fahr.
		Coal-Fired Boilers.	*Oil-Fired Boilers.*	
Total deadweight in tons	10,050	10,230	10,235	10,235
Freight-earning cargo in tons	9,357	7,880	8,555	8,743
Average sea-power, horse-power . . .	2,500 (Shaft)	2,800 (Indicated)	2,800 (Indicated)	2,500 (Shaft)
Radius of action in miles	10,500	10,500	10,500	10,500
Fuel consumption per brake horse-power hour, including auxiliaries, in lb.	0·45	2·0	1·4	1·1
* Fuel consumption per day in tons . . .	12·1	53·5	37·5	29·5
Fuel consumption per voyage of 16 days, in tons	194	856	600	472
Comparative Costs of Working.				
Provisions, total per month	£151	£184 15*s.* 0*d.*	£156 10*s.* 0*d.*	£156 10*s.* 0*d.*
Wages, total per month .	£404	£468	£408	£408
Fuel, per 16 days' sailing	£776 (£4 0*s.* 0*d.* per ton)	£1,070 (£1 5*s.* 0*d.* per ton)	£1,800 (£3 0*s.* 0*d.* per ton)	£1,416 (£3 0*s.* 0*d.* per ton)
Fuel, per month of 24 days' sailing . . .	£1,164	£1,605	£2,700	£2,124
Cost of running for one year of 288 days' sailing	£20,628	£27,096	£39,168	£32,265
Tons of freight-earning cargo carried, assuming 9 round voyages per year, each of 32 days' total sailing out and home	168,426	141,840	153,990	157,274
Cost per ton of cargo carried per 16 days' sailing out and home .	2*s.* 5*d.*	3*s.* 10*d.*	5*s.* 1*d.*	4*s.* 1*d.*
Cost per ton-mile . .	·0076*d.*	·0114*d.*	·0152*d.*	·0121*d.*

* Calorific value of oil fuel taken at 19,000 B.Th.U.'s. Calorific value of coal taken at 13,500 B.Th.U.'s.

Note.—No cognizance has been taken in the above table of the fact that with Diesel ships, bunker fuel oil, costing £3 per ton, can be used.

IMPORTANT MOTOR SHIPS IN SERVICE AND BUILDING, GIVING PARTICULARS OF THEIR MACHINERY.

Date.	Name of vessel.	Makers of machinery.	Type of engine.	Cycle.	No. of eng.	Total B.H.P.	I.H.P. per engine.	B.H.P. per engine.	No. of cyl. per eng.	B.H.P. per cyl.	Diameter of cyl. in ins.	Stroke in ins.	Ratio stroke to bore.	Revs. per min.	Piston speed. Ft. per min.	M.P. on B.H.P. basis.	M.P. on I.H.P. Basis.	Consumption of fuel in lbs. per sq. in. piston area.
1912*	Juno	Werkspoor	Werkspoor	4 single act.	1	1,100	1,460	1,100	6	183	22	39⅜	1·79	125	820	84·0	111·0	0·219
1918*	Aba (ex-Glenapp)	Harland & Wolff	Burmeister and Wain	4 single act.	2	5,250	3,200	2,625	8	328	29½	43 5/16	1·46	115	830	76·0	93·0	0·202
1920*	Glenogle	Harland & Wolff	Burmeister and Wain	4 single act.	2	5,250	3,200	2,625	8	328	29⅛	45¼	1·55	115	865	75·0	91·5	0·206
1920*	Ansaldo SanGiorgio Terzo	Ansaldo San Giorgio	Ansaldo	2 single act.	2	2,400	1,600	1,200	4	300	24⅘	35⅖	1·43	110	650	63·0	84·0	0·272
1920*	Sardinia	Werkspoor	Werkspoor	4 single act.	1	1,600	2,140	1,600	6	267	26⅜	47¼	1·79	110	865	74·5	100·0	0·205
1921*	Domala	N.B. Diesel Eng. Works, Ltd.	N.B. Diesel	4 single act.	2	4,000	2,500	2,000	8	250	26⅜	47	1·77	96	752	79·5†	99·5	0·191
1922*	Arnus	Swan Hunter & Wigham Richardson	Neptune-Polar	2 single act.	2	2,100	1,400	1,050	6	175	17	35	2·06	125	730	70·0	93·0	0·33
1922*	Scottish Musician	Vickers, Ltd.	Vickers	4 single act.	2	2,500	1,620	1,250	6	208	24½	39	1·59	118	767	76·0	99·0	0·185‡
1922*	Pacific Commerce *ex* Dominion Miller	Doxford	Doxford	2 opposed p.	1	2,700	3,000	2,700	4	675	22 13/16	91¼ comb'd.	2·0	77	585	93·0	103·0	0·362‡
1922*	Loch Katrine	Harland & Wolff	Burmeister and Wain	4 single act.	2	5,250	3,200	2,625	8	328	29⅛	45¼	1·55	115	865	75·0	91·5	0·206
1923*	Dalgoma	Stephen & Sons	Sulzer	2 single act.	2	3,200	2,200	1,600	4	400	26¾	43 5/16	1·62	85	613	76·5	105·0	0·312
1923*	Medon	Burmeister & Wain	Burmeister and Wain	4 single act.	1	2,400	3,100	2,400	8	300	29⅛	59 1/16	2·02	85	838	71·0	92·0	0·192§
1923*	Pizarro	Beardmore & Co.	Beardmore-Tosi	4 single act.	1	1,250	1,670	1,250	6	208	24 7/16	38⅜	1·57	115	735	76·0	100·0	0·185
1923*	Sycamore	Richardsons, Westgarth	Beardmore-Tosi	4 single act.	2	2,500	1,670	1,250	6	208	24 7/16	38⅜	1·57	120	767	74·0	98·0	0·187
1923*	Camranh	Sulzer	Sulzer	2 single act.	2	3,400	2,400	1,700	4	425	27	47	1·62	85	612	81·0	115·0	0·333
1924*	Dolius	Scott Ship.& Eng. Co.	Still	2 double act.	2	2,500	1,500	1,250	4	312	22	36	1·64	120	720	70 oil 6 steam	84 oil 7·2 st'm	0·28‖
1924*	Aorangi	Fairfield S. & E. Co.	Sulzer	2 single act.	4	13,000	4,400	3,250	6	542	27½	39	1·42	135	880	68·5	93·0	0·382¶
1924*	British Aviator	Palmers S. B. & I. Co.	Camellaird-Fullagar	2 opposed p.	1	3,000	4,000	3,000	6	500	23	72	1·56	86	516	77·0	102·0	0·258
1924*	Swanley	N.B. Diesel Co.	N.B. Diesel	2 double act.	1	2,000	2,750	2,000	3	667	24½	44	1·8	100	735	64·0	88·0	0·296
1925	Gripsholm	Burmeister & Wain	Burmeister and Wain	4 double act.	2	13,500	8,800	6,750	6	1,125	33	59	1·75	125	1,250	77·0	99·5	0·3
1925*	Moveria	Vickers, Ltd.	Vickers	4 single act.	1	2,700	3,500	2,700	8	338	30	45	1·5	110	825	76·0	99·0	0·22‡

* In operation at sea. † No compressor on engine. ‡ Solid injection. § Longstroke type. ‖ Oil and steam. ¶ Quadruple screw.

LIST OF THE PRINCIPAL COMMERCIAL FUEL-OIL BUNKERING STATIONS ESTABLISHED THROUGHOUT THE WORLD.

VARIOUS publications, British and American, interested in oil or shipping matters furnish particulars from time to time of fuel-oil bunkering stations, either by way of more or less comprehensive general lists or of announcements by oil-distributing companies. Some of the more comprehensive lists, whilst valuable as showing the widespread provision of fuel oil supplies already made or contemplated, do not in all cases, however, distinguish between installations in actual operation and those under construction, or clearly indicate whether Government installations are the only ones existing at particular ports. In compiling the following list from many sources, our aim has been to specify the principal bunkering ports at which commercial oil installations are in operation. Whilst absolute accuracy cannot be guaranteed, much care has been taken to eliminate errors.

Aalborg (Denmark)
Aarhus
Abadan (Persia)
Aberdeen
Abo (Finland)
Adelaide
Aden
Ajaccio
Alexandria
Algiers
Almeria
Amoy (China)
Amsterdam
Ango-Ango (Congo)
Antilla
Antofagasta (Chile)
Antwerp
Aomori
Arica (Chile)
Astoria
Auckland (N.Z.)
Augusta (Sicily)
Avonmouth
Azores (Ponta Delgada)
Bahia Blanca (Arg.)
Bahia (Brazil)
Balboa (Panama)
Balik Pappan (Borneo)
Baltimore
Bangkok (Siam)
Barcelona
Barranquilla (Colombia)
Barrow
Basrah
Batavia
Baton Rouge (La.)
Batum
Bayonne, N.J.
Beaumont (Texas)
Beira
Belfast
Belize (Honduras)
Bergen
Bermuda
Bilbao
Birkenhead
Bizerta (Tunis)
Boelbaai Ceram
Boma (Congo)
Bombay
Bordeaux
Boston (U.S.A.,
Bourgas (Turkey)
Bremen
Brest
Bridgetown (Barbadoes)
Brighton (Trinidad)
Brixham
Brunsbuettel-Ostermoor
Brunswick
Buenos Aires
Cadiz
Calcutta
Caleta Buena (Chile)
Callao
Campana
Canton
Cape Town
Cardiff
Casablanca
Cebu (Philippines)
Ceram (D.E.I.)
Ceuta
Charleston
Cherbourg
Chittagong (India)
Cienfuegos (Cuba)
Civita Vecchia
Claxton Bay (Trinidad)
Cochin (India)
Colombo
Colon (Pan. Canal)
Conception del Uruguay
Constanza
Constantinople
Copenhagen
Corinto (Nicaragua)
Cork
Corunna
Cristobal
Curacao
Dakar (W. Africa)
Dantzig
Destrehan
Donges
Dover
Dublin
Dunkirk
Durban
Emden
Eten (Peru)
Falmouth
Fall River (Mass.)
Fayal
Ferrol
Folkestone
Foochow
Fort William (Ont.)
Foynes
Fredericia
Fremantle
Funchal
Galveston
Gemsah
Genoa
Georgetown
Gibraltar
Glasgow
Gothenburg
Granatello (Italy)
Grancy Island (Va.)
Grangemouth
Granton
Grimsby
Guayaquil
Gulf Port (Miss.)
Halifax (Canada)
Hamburg
Hamilton (Ont.)
Hankow
Harwich
Havana
Havre
Helsingfors
Hong Kong
Honolulu
Houston (Texas)
Hull
Hurghada
Ichang (China)
Ilo Ilo (Philip. Is.)
Immingham
Iquique (Chile)
Itosaki
Jacksonville (Fla.)
Jarrow-on-Tyne
Junin (Chile)
Karachi
Ketchikan
Kettle Point (R.I.)
Key West
Kiel
Kingston (Jamaica)
Kobe
La Guayra (Venez.)
La Pallice
La Plata (Argentine)
La Rochelle
Las Palmas
Leghorn
Leith
Levis
Lisbon
Liverpool
Lobitos
London :
  Thameshaven, Purfleet, etc.
Lorient
Los Angeles
Lourenço Marques
Macassar (Celebes)

MAP OF THE WORLD'S DIESEL OIL BUNKERING STATIONS.

(Reprinted from "The Motor Ship.")

Madras
Malmo
Malta
Manati (Cuba)
Manchester Ship Canal
Manila
Maracaibo (Venez.)
Marmagoa (India)
Marseilles
Mantanzas (Cuba)
Mauritius
Mejillones (Chile)
Melbourne
Messina (Sicily)
Middlesbrough
Minatitlan (Mexico)
Miri
Mobile (Alabama)
Mollendo (Peru)
Mombasa
Monopoli
Montevideo
Montreal
Nagasaki
Naples
Neuvitas (W. Indies)
Newcastle-on-Tyne
New Orleans
New York
Niigata (Japan)
Nonai
Nordenham
Norfolk (Va.)
Nyborg
Odense (Denmark)
Oleum (Cal., U.S.A.)
Oran
Oslo
Paitaz (Peru)
Pago Pago (Samoa)
Palembang (Sumatra)
Palermo
Palo Blanco (Mex.)
Pangkalan - Berandan
Papeete (Tahiti)
Para (Brazil)
Paramaribo (Dutch Guiana)
Passaic (N.J.)
Payta
Penang
Pensacola (Florida)
Perim
Pernambuco
Philadelphia
Piræus
Pisagua
Plymouth
Point à Pierre (Trinidad)
Point Fortin (Trinidad)
Point Wells
Ponce
Ponta Delgada (Azores)
Port Arthur (Texas)
Port Edgar
Portici
Portishead
Portland (Maine)
Portland (Ore.)
Port of Spain
Port St. Luis du Rhone (France)
Port Said
Port Sudan
Prince Rupert (B.C.)
Providence (R I.)
Puerto Barrios (Guatemala)
Puerto Cabello (Venez.)
Puerto Mexico
Puloe Samboe
Pulo Bukom
Quebec
Regla (Cuba)
Richmond (Va.)
Rangoon
Rio de Janeiro
Rochefort
Rotterdam
Rouen
Sabine
Sabang
Saigon (French Cochin China)
Saitozaki
St. Georges
St. John (N.B.)
St. Nazaire
St. Thomas
St. Vincent
Salina Cruz (Mex.)
Salinas (Chili)
Salonica
San Antonio (Chile)
San Diego
San Domingo
San Francisco
San Juan (P. Rica)
San Luis Obispo (Cal., U.S.A.)
San Pedro (Cal.)
Santander
Santos (Brazil)
Sarnia
Savannah
Savona
Seattle (Wash.)
Shanghai
Singapore
Smyrna
Soerabaya (Java)
Southampton
South Shields
Spezia
Stavanger
Stettin
Stockholm
Strasburg
Suez
Sunderland
Supe (Peru)
Svolvaer (Norway)
Swansea
Swatow (China)
Sydney
Tacoma
Talara (Peru)
Taltal (Chile)
Tambes (Peru)
Tampa (Florida)
Tampico (Mexico)
Tarakan (Borneo)
Teneriffe
Tientsin
Tocopilla (Chile)
Toronto
Toulon
Trieste
Trinidad
Trondjhem
Tsuchizaki (Japan)
Tunis
Tuticorin (India)
Tuxpam (Mexico)
Vado
Vallo (Norway)
Valparaiso
Vancouver
Venice
Vera Cruz (Mexico)
Victoria (B.C.)
Wellington (N.Z.)
Willbridge
Willemstad (Curacao)
Yati (Paraguay)
Yokohama
Zanzibar

PRODUCTION OF CRUDE OIL IN VARIOUS REGIONS.

Country.	Production of Crude Petroleum in—								
	1880.	1890.	1900.	1910.	1920.	1921.	1922.	1923.	1924.
	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.
United States . . .	26,286,123	45,823,572	63,620,529	209,557,248	443,402,000	472,183,000	557,531,000	732,407,000	714,000,000
Mexico	—	—	—	3,634,080	163,540,000	193,397,587	182,278,000	149,585,000	139,587,000
Trinidad	—	—	—	142,857	2,083,027	2,354,000	2,445,000	3,051,000	4,284,000
Argentina	—	—	—	20,753	1,665,989	1,747,410	3,018,000	3,400,000	3,844,000
Peru	—	—	274,800	1,330,105	2,816,649	3,699,280	5,314,000	5,699,000	7,812,000
Venezuela	—	—	—	—	—	1,433,000	2,201,000	4,201,000	9,500,000
Dutch East Indies .	—	—	2,253,355	11,030,620	17,529,210	16,958,105	16,720,000	19,868,000	21,000,000
Egypt	—	—	—	—	1,042,000	1,255,000	1,189,000	1,054,000	1,107,000
India	—	118,065	1,078,264	6,137,990	7,500,000	8,000,000	8,529,000	8,320,000	8,150,000
Japan *	25,497	51,420	866,814	1,930,661	2,139,777	2,447,000	2,055,000	1,805,000	1,600,000
Persia	—	—	—	—	—	16,673,000	22,247,000	28,326,000	31,845,000
Sarawak	—	—	—	—	—	1,411,000	2,849,000	3,940,000	4,500,000
Poland	229,120	659,012	2,346,505	12,673,688	5,606,116	5,167,000	5,227,000	5,373,000	5,710,000
Roumania	114,321	383,227	1,628,535	9,723,806	7,435,344	8,368,000	9,843,000	10,867,000	13,296,000
Russia	3,001,200	28,691,218	75,779,417	70,336,574	25,429,600	29,150,000	35,692,000	39,156,000	45,162,000
Other Countries . .	761,345	906,324	1,283,897	1,419,247	14,654,288†	1,032,000	1,578,000	1,539,000	1,742,000
Total	30,017,606	76,632,838	149,132,116	327,937,629	694,854,000	765,065,000	858,715,000	1018,591,000	1013,139,000
Percentages of increase	418 over 1870	155·4 over 1880	94·5 over 1890	119·8 over 1900	111·9 over 1910	10·1 over 1920	12·2 over 1921	18·5 over 1922	·5 % *decrease* over 1923.

NOTE.—The figures in the above table may be taken as approximately accurate, allowing for the more or less exact methods of various tabulators, *e.g.* in the capacity of the "barrel." The standard usually taken is 42 U.S. gallons to the barrel. The later figures for Russia, and in one or two other instances where authoritative returns are not published, have had to be partly estimated.

* The figures for Japan include Formosa. † Includes Persia.

"EXPORTS" OF NEW SHIPS FROM THE UNITED KINGDOM.

Ships not Registered as British, with their Machinery.

Year.	War Vessels.	Steam Ships (other than War Vessels). Hulls and Fittings.	Steam Ships (other than War Vessels). Machinery.	Sailing Ships (other than War Vessels) including Boats.	Total of New Ships.
	£	£	£	£	£
1903	74,480	2,798,737	1,222,108	188,504	4,283,829
1904	388,600	2,570,835	1,164,779	330,937	4,455,151
1905	50,000	3,693,422	1,516,183	171,693	5,431,298
1906	2,800,000	3,973,873	1,668,592	201,706	8,644,171
1907	554,700	6,586,449	2,550,702	326,262	10,018,113
1908	1,879,994	5,902,428	2,505,280	189,773	10,567,475
1909	247,000	3,698,556	1,819,618	161,940	5,927,114
1910	4,894,500	2,553,427	1,209,119	113,158	8,770,204
1911	25,000	3,745,349	1,632,402	259,564	5,663,115
1912	765,000	4,243,308	1,750,351	268,503	7,027,162
1913	2,617,100	5,867,179	2,336,509	205,742	11,026,530
1914	308,385	4,716,226	1,784,900	123,043	6,932,554
1915	—	1,170,606	472,597	49,548	1,692,661
1916	20,000	754,372	481,703	34,510	1,290,585
1917	—	706,084	347,354	33,869	1,087,307
1918	—	778,525	229,292	39,517	1,047,334
1919	—	1,703,961	505,652	118,718	2,328,331
1920	—	26,280,243		295,771	26,576,016
1921	—	29,523,833		470,615	29,994,448
1922	—	30,222,080		220,435	30,442,515
1923	—	9,566,187		148,474	9,714,661
1924	—	5,257,957		264,388	5,522,345

HIGHEST AND LOWEST IRON AND STEEL PRICES, 1914-1924.

	1914.			1916.			1918.			1920.			1922.			1924.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Marked Iron Bars, S. Staffs	9	0	0	15	10	0	20	0	0	33	10	0	16	0	0	15	0	0
	8	10	0	13	10	0	14	15	0	26	15	0	13	10	0	14	10	0
Common Iron Bars, Cleveland	8	2	6	15	0	0	20	0	0	30	0	0	13	0	0	12	10	0
	7	10	0	13	0	0	14	15	0	24	5	0	10	10	0	12	0	0
Steel Ship Plates, ⅜-in., Middlesbrough	7	10	0	14	5	0	16	10	0	24	10	0	10	10	0	10	10	0
	7	0	0	11	0	0	11	10	0	20	0	0	9	0	0	9	10	0
Steel Ship Angles, Middlesbrough	7	5	0	18	2	6	16	2	6	24	0	0	10	0	0	10	0	0
	6	15	0	10	15	0	11	2	6	19	10	0	8	12	6	9	5	0
Steel Ship Plates, Glasgow	7	5	0	13	15	0	16	10	0	28	5	0	10	10	0	12	10	0
	6	17	6	11	10	0	11	10	0	21	10	0	8	5	0	9	15	0
Steel Ship Angles, Glasgow	7	0	0	18	2	6	18	2	6	26	10	0	10	0	0	10	0	0
	6	7	6	11	2	6	11	2	6	19	10	0	8	5	0			
Steel Boiler Plates, Middlesbrough	8	5	0	14	10	0	17	10	0	31	0	0	14	10	0	14	0	0
	8	0	0	12	10	0	12	10	0	23	0	0	12	10	0	13	0	0
Steel Boiler Plates, Glasgow	7	5	0	14	15	0	17	10	0	31	10	0	14	10	0	14	0	0
	7	0	0	12	10	0	12	10	0	24	0	0	12	10	0	13	0	0

HIGHEST AND LOWEST FUEL OIL PRICES, 1914-1924.

	1914.			1916.			1918.			1920.			1922.			1924.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Heavy	3	2	0	8	0	0	8	10	0	13	0	0	3	15	0	4	2	6
	2	5	0	7	0	0				9	17	6	3	0	0	3	17	6
Light	3	10	0	9	0	0	9	10	0	15	0	0	5	5	0	5	2	6
	2	15	0	7	5	0				11	5	0	4	0	0	4	17	6

COAL PRODUCTION AND DISTRIBUTION OF THE UNITED KINGDOM. (*See diagrams on page* 533.)

Year.	Total production. (Thousand tons.)	Home consumption. (Thousand tons.)	Exported * (Thousand tons.)	Bunkers. (Foreign trade.) (Thousand tons.)
1902	227,095	168,788	43,159	15,148
1903	230,334	168,584	44,950	16,800
1904	232,428	168,981	46,256	17,191
1905	236,129	171,256	47,477	17,396
1906	251,068	176,878	55,600	18,590
1907	267,831	185,602	63,610	18,619
1908	261,529	179,508	62,547	19,474
1909	263,774	180,983	63,077	19,714
1910	264,433	182,822	62,085	19,526
1911	271,892	188,029	64,599	19,264
1912	260,416	177,681	64,444	18,291
1913	287,412	192,980	73,400	21,032
1914	265,430	187,854	59,040	18,536
1915	253,179	196,013	43,535	13,631
1916	255,846	204,506	38,352	12,988
1917	248,041	202,817	34,996	10,228
1918	226,557	186,048	31,753	8,756
1919	229,037	181,766	35,250	12,021
1920	229,295	190,523	24,932	13,840
1921	164,344	128,757	24,661	10,926
1922	250,808	168,350	64,198	18,259
1923	278,141	180,533	79,450	18,158
1924	269,134	189,793	61,651	17,689

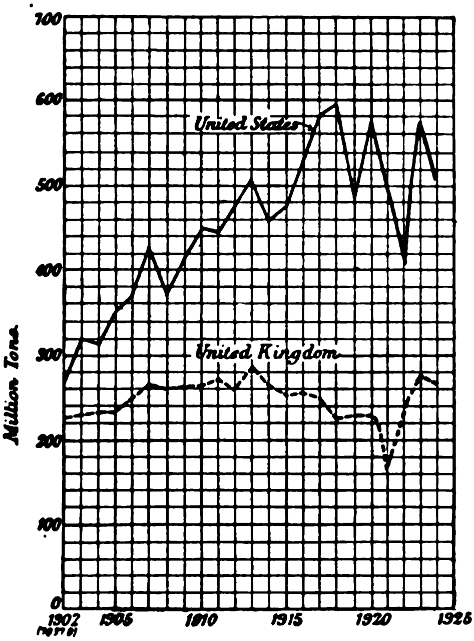
* Excluding coke and manufactured fuel.

COAL PRODUCTION AND DISTRIBUTION OF THE UNITED STATES. (*See diagrams on page* 533.)

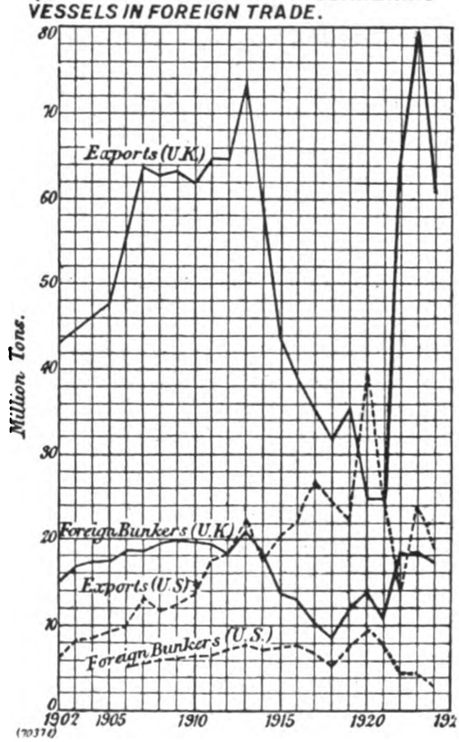
Year.	Total production.* (Thousand tons.)	Home consumption. (Thousand tons.)	Exported. (Thousand tons.)	Bunkers. (Foreign trade.) (Thousand tons.)
1902	269,277	Figures not available	6,127	Figures not available
1903	319,068	,,	8,312	,,
1904	314,122	,,	8,573	,,
1905	350,645	,,	9,189	,,
1906	369,783	354,736	9,922	5,125
1907	428,896	409,989	13,153	5,754
1908	371,288	353,411	11,853	6,024
1909	411,442	392,786	12,537	6,119
1910	447,854	427,602	13,806	6,446
1911	443,189	419,089	17,433	6,667
1912	477,202	451,713	18,149	7,340
1913	508,893	479,051	22,141	7,701
1914	458,505	433,607	17,632	7,266
1915	474,660	446,884	20,305	7,471
1916	526,873	495,904	23,143	7,826
1917	581,609	548,077	26,649	6,883
1918	605,546	575,622	24,392	5,532
1919	494,600	464,808	22,402	7,343
1920	577,738	529,161	39,415	9,362
1921	452,139	419,762	24,829	7,548
1922	425,849	408,280	13,449	4,120
1923	572,182	543,935	23,700	4,547
1924	512,048	489,208	18,851	3,989

* Figures given include both anthracite and bituminous coal.

PRODUCTION OF COAL IN THE UNITED KINGDOM & THE UNITED STATES.



EXPORTS OF COAL FROM THE UNITED KINGDOM & THE UNITED STATES, ALSO QUANTITIES SUPPLIED FOR BUNKERING VESSELS IN FOREIGN TRADE.



PRICES OF BRITISH BUNKER COALS, 1914 TO 1924.

Class of Coal.	Average prices 1914.		Highest and Lowest Prices. 1915		1916		1917		1918		1919		1920		1921		1922.		1923		1924	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Durham Bunkers—	12	8½	30	0	42	6	26	6	75	0	100	0	120	0	60	0	25	0	37	6	30	0
(Tyne special) .			12	6	22	6	20	0	25	0	32	0	33	6	26	0	19	6	23	0	18	0
Durham Bunkers—	12	0½	25	0	39	0	24	0	65	0	90	0	115	0	52	0	23	0	33	0	28	0
(Tyne ordinary) .			10	3	18	0	16	0	24	0	31	0	32	0	24	0	19	0	20	0	17	0
Cardiff Bunkers—	9	6	23	6	34	0	21	6	28	6	85	0	97	6	55	0	23	0	33	0	23	0
Small (class 1) .			10	0	14	6	13	0	21	6	28	6	35	0	18	6	16	0	17	0	14	6
Cardiff Bunkers—	13	0	24	0	40	0	25	0	35	6	80	0	110	0	50	0	24	0	35	0	24	0
No. 2 through .			12	0	15	6	16	6	23	6	35	6	50	0	20	0	18	0	18	0	18	0
South Derbyshire—	—		26	3	42	6	35	0	70	0	70	0	80	0	53	0	28	0	33	6	32	6
Steam hard . .			14	9	20	6	24	0	30	0	37	0	37	0	26	0	23	6	24	0	21	0
Yorkshire nuts—	12	7½	21	0	28	0	27	6	60	0	60	0	80	0	50	0	30	0	33	0	30	0
Doubles . . .			14	6	21	0	24	0	25	0	32	0	32	0	27	0	22	0	25	0	21	6
Scotch Navigation—	16	1½	26	0	40	0	32	6	70	0	95	0	97	6	75	0	28	6	32	0	30	0
f.o.b. Glasgow .			13	9	24	0	26	0	30	0	37	0	72	6	26	0	25	0	24	6	20	3
Scotch Navigation—	13	3	30	0	50	0	33	6	70	0	110	0	142	0	60	0	30	0	35	0	32	0
f.o.b. Fife Ports .			16	6	23	0	27	0	31	0	38	0	73	0	28	0	26	0	27	6	24	0
Best Lancashire—	—		—		26	0	27	6	65	0	47	6	50	0	47	6	26	6	28	0	31	6
Steam					21	6	23	0	27	6	34	6	37	6	24	0	20	0	20	0	17	6

NATIONALITY AND NET TONNAGE OF VESSELS WHICH ENTERED AND CLEARED WITH CARGOES IN THE FOREIGN TRADE OF THE UNITED KINGDOM FOR THE YEARS 1913 AND 1924.

Nationality.	Entrances.		Clearances.		Entrances.		Clearances.	
	1913.	1924.	1913.	1924.	1913.	1924.	1913.	1924.
	Tons.*	Tons.*	Tons.*	Tons.*				
British	32,292	36,857	40,101	41,699	65·8	66·5	59·1	63·9
Foreign:—								
Norwegian	3,285	2,561	4,683	3,042	6·7	4·6	6·9	4·7
United States of America	724	2,777	370	1,364	1·5	5·0	0·5	2·1
Swedish	1,891	1,687	3,016	2,036	3·9	3·0	4·5	3·1
Dutch	1,702	2,426	2,536	2,951	3·5	4·4	3·7	4·5
Danish	1,161	1,490	2,613	2,333	2·4	2·7	3·9	3·6
French	999	1,636	1,975	3,660	2·0	3·0	2·9	5·6
Belgian	1,369	979	957	1,161	2·8	1·8	1·4	1·8
Japanese	140	458	282	476	0·3	0·8	0·4	0·7
Spanish	1,060	959	1,694	1,383	2·2	1·7	2·5	2·1
Italian	122	403	955	830	0·2	0·7	1·4	1·3
Russian	678	—	937	—	1·4	—	1·4	—
Greek	221	418	1,072	828	0·4	0·8	1·6	1·3
German	3,166	1,921	5,730	2,294	6·4	3·5	8·5	3·6
Austro-Hungarian	128	—	715	—	0·3	—	1·0	—
Other Nationalities	125	797	185	1,191	0·2	1·5	0·3	1·7
Total Foreign	16,772	18,512	27,720	23,549	34·2	33·5	40·9	36·1
Total British and Foreign	49,064	55,369	67,821	65,248	100·0	100·0	100·0	100·0

	Entrances and Clearances.		Percentages.	
	1913.	1924.	1913.	1924.
	Tons.*	Tons.*		
British	72,393	78,556	62	65
Foreign	44,490	42,061	38	35
Total	116,883	120,617	100	100

* *Figures in thousands, i.e. hundreds omitted.*

NOTE.—For 1924 figures of trade with the Irish Free State are included.

NATIONALITY AND NET TONNAGE OF VESSELS WHICH ENTERED AND CLEARED WITH CARGOES AND IN BALLAST IN THE FOREIGN TRADE OF THE UNITED STATES OF AMERICA FOR THE YEARS ENDED 30TH JUNE, 1913, AND 31ST DECEMBER, 1923.

Nationality.	Entrances.		Clearances.		Percentages.			
					Entrances.		Clearances.	
	1913.	1923.	1913.	1923.	1913.	1923.	1913.	1923.
	Tons.*	Tons.*	Tons.*	Tons.*				
American	5,241	20,984	5,289	21,305	13·8	39·8	14·1	40·0
British	19,697	17,609	19,360	17,722	51·9	33·4	51·5	33·2
Other Nationalities:—								
Austrian	438	—	424	—	1·2	—	1·1	—
Belgian	352	360	356	332	0·9	0·7	0·9	0·6
Danish	481	938	446	912	1·3	1·8	1·2	1·7
Dutch	1,049	1,214	1,077	1,165	2·8	2·3	2·9	2·2
French	1,027	1,479	1,034	1,468	2·7	2·8	2·8	2·8
German	4,578	992	4,587	1,012	12·1	1·9	12·2	1·9
Italian	838	1,444	802	1,448	2·2	2·7	2·1	2·7
Norwegian . . .	2,774	3,244	2,798	3,179	7·3	6·1	7·4	6·0
Portuguese . . .	14	—	15	2	—	—	—	—
Russian	130	—	130	—	0·3	—	0·3	—
Spanish	391	498	374	487	1·0	0·9	1·0	0·9
Swedish	60	623	65	655	0·2	1·2	0·2	1·2
All other Nationalities	903	3,390	809	3,528	2·3	6·4	2·3	6·8
Total . . .	37,973*	52,775*	37,566*	53,215*	100·0	100·0	100·0	100·0

	Entrances and Clearances.			Percentage of Total.		Percentage. Increase or Decrease.
	1913.	1923.	Difference.	1913.	1923.	
	Tons.*	Tons.*	Tons.*			
American . . .	10,530	42,289	Increase 31,759	14	40	Increase 302
British	39,057	35,331	Decrease 10,687	52	33	Decrease 27
Other Nationalities	25,952	28,370	Increase 2,418	34	17	Increase 9
Total . . .	75,539*	105,990*	Increase 30,451*	100	100	Increase 40

* *Figures in thousands, i.e. hundreds omitted.*

PROPORTION OF U.S.A. EXPORTS CARRIED IN BRITISH, AMERICAN, AND OTHER VESSELS, AS SHOWN BY THE CLEARANCES WITH CARGOES IN THE OVERSEAS TRADE OF THE UNITED STATES OF AMERICA.

—	Clearances with Cargoes.			
	1913.	Percentage 1913.	1923.	Percentage 1923.
	Net Tons.		Net Tons.	
British Vessels	21,825,638	49	18,824,000	38
American Vessels	10,917,760	25	16,189,000	33
All other Vessels	11,739,449	26	14,067,000	29
Total Clearances with Cargoes .	44,482,847	100	49,080,000	100

VALUES OF UNITED KINGDOM IMPORTS, EXPORTS AND RE-EXPORTS.

Year.	Imports.	Exports.			Total Imports and Exports.
		British Produce.	Foreign and Colonial Produce.	Total Exports.	
	£	£	£	£	£
1890	420,691 997	263,530,585*	64,721,533	328,252,118	748,944,115
1900	523,075,163	291,191,996	63,181,758	354,373,754	877,448,917
1910	678,257,024	430,384,772	103,761,045	534,145,817	1,212,402,841
1913	768,734,739	525,253,595	109,566,731	634,820,326	1,403,555,065
1914	696,635,113	430,721,357	95,474,166	526,195,523	1,222,830,636
1915	851,893,350	384,868,448	99,062,181	483,930,629	1,335,823,979
1916	948,506,492	506,279,707	97,566,178	603,845,885	1,552,352,377
1917	1,046,164,678	527,079,746	69,677,461	596,757,207	1,660,921,885
1918	1,316,150,903	501,418,997	30,945,081	532,364,078	1,848,514,981
1919	1,626,156,212	798,638,362	164,746,315	963,384,677	2,589,530,889
1920	1,932,648,881	1,334,469,269	222,753,331	1,557,222,600	3,489,871,481
1921	1,085,500,061	703,399,542	106,919,306	810,318,848	1,895,818,909
1922	1,003,098,899	719,507,410	103,694,670	823,202,080	1,826,300,979
1923	1,096,226,214	767,257,771	118,543,805	885,801,576	1,982,027,790
1924	1,279,844,597	795,364,581	104,148,957	899,513,538	2,179,358,135

* Excluding value of ships and boats (new) with their machinery; this item is included in the later figures.

VALUES OF UNITED STATES IMPORTS AND EXPORTS, SHOWING PERCENTAGE CARRIED IN AMERICAN VESSELS.—(BY TEN-YEAR PERIODS GENERALLY.)

Fiscal Year.	By Sea (including all Great Lakes water-borne foreign Commerce).				By Land Vehicles. Value in Dollars.	Total by Land and Sea. Value in Dollars.
	In American Vessels. Value in Dollars.	In Foreign Vessels. Value in Dollars.	Total. Value in Dollars.	Per cent. American Vessels.		
1821	113,210,462	14,358,235	127,559,679	88·7	—	—
1830	129,918,458	14,447,970	144,366,428	89·9	—	—
1840	198,424,609	40,802,856	239,227,465	82·9	—	—
1850	230,272,084	90,764,954	330,037,038	72·5	—	—
1860	507,247,757	255,040,793	762,288,550	66·5	—	—
1870	352,969,401	638,927,488	991,896,889	35·6	—	991,896,889
1880	258,346,577	1,244,265,433	1,482,612,011	17·4	20,981,393	1,503,593,404
1890	202,451,086	1,371,116,744	1,573,567,830	12·9	73,571,263	1,647,139,093
1900	195,084,192	1,894,444,424	2,089,528,616	9·3	154,895,650	2,224,424,266
1910	260,837,147	2,721,962,475	2,982,799,622	8·7	319,132,528	3,301,932,150
1913	381,032,496	3,392,028,429	3,773,060,925	10·1	505,831,459	4,278,892.384
1914	368,359,756	3,417,108,756	3,785,468,512	9·7	473,036,293	4,258,504,805
1915	571,931,912	2,420,693,563	3,992,625,475	14·3	450,133,605	4,442,759,080
1916	948,908,216	4,877,132,995	5,826,041,211	16·3	705,325,184	6,531,366,395
1917	1,452,086,468	6,367,408,665	7,819,495,133	18·6	1,129,908,446	8,949,403,579
1918	1,688,495,946	6,015,204,510	7,703,700,456	21·9	1,161,666,318	8,865,366,774
1919*	3,823,763,693	6,679,895,162	10,503,658,855	36·4	1,321,132,067	11,824,790,922
1920*	5,154,337,761	6,830,563,705	11,984,901,466	43·0	1,523,256,493	13,508,157,959
1921*	2,166,796,204	3,908,315,192	6,075,111,396	35·7	919,036,703	6,994,148,099
1922*	2,161,715,609	3,803,167,434	6,964,883,043	31·0	881,163,751	7,846,046,794
1923*	2,398,218,424	4,452,363,924	6,950,582,348	34·5	1,001,656,437	7,952,238,785
1924*	2,544,350,150	4,610,834,030	7,155,184,180	35·5	1,046,350,344	8,201,534,524

* Up to and including 1918, the statistics given are for years ended on June 30; from 1919 onwards they are given for calendar years.

ENTRANCES AND CLEARANCES IN THE FOREIGN TRADE OF THE UNDERMENTIONED COUNTRIES FOR THE YEARS 1913, 1923, AND 1924.

Note.—C = With Cargo only. C & B = With Cargo and in Ballast.

Countries.		Entrances.			Clearances.		
		1913.	1923.	1924.	1913.	1923.	1924.
		Thousand tons net.	Thousand tons net.	Thousand tons net.	Thousand tons net.	Thousand tons net.	Thousand tons net.
United Kingdom	C	49,068	51,084	55,369	67,824	70,668	65,248
United States of America	C & B	53,280	66,319	68,223	53,796	66,624	68,823
France	C	34,512	41,818	42,575	26,112	30,750	32,644
Japan	C & B	24,720	37,548	42,744	24,900	37,056	43,296
Netherlands	C	17,148	16,272	18,060	11,016	11,532	15,169
Spain	C & B	25,788	24,588	22,536	28,992	20,772	19,644
British India	C	6,700	6,573	6,887	8,256	7,787	8,399
Australia	C & B	5,364	4,848	4,993	5,232	4,896	5,026
South Africa	C & B	5,352	5,137	4,980	5,280	5,005	4,738
Norway	C	8,756	3,192	3,480	4,740	4,092	4,836
Belgium	C	16,908	20,448	22,317	16,896	20,304	22,343
Sweden	C & B	13,764	12,192	12,391	17,004	12,337	12,380
Brazil	C & B	29,172	30,240	*	29,208	*	*

ABOVE AS PERCENTAGES OF 1913 FIGURES.

United Kingdom	100	104	113	100	104	96
United States of America	100	127	128	100	124	128
France	100	121	123	100	117	125
Japan	100	152	173	100	149	174
Netherlands	100	95	105	100	105	138
Spain	100	95	87	100	72	68
British India	100	98	103	100	94	102
Australia	100	90	93	100	94	96
South Africa	100	96	93	100	95	90
Norway	100	85	93	100	86	102
Belgium	100	121	132	100	120	132
Sweden	100	89	90	100	72	73
Brazil	100	104	*	100	*	*

* Figures not available.

NUMBER AND NET TONNAGE OF VESSELS THAT PASSED THROUGH THE SUEZ CANAL IN THE YEARS 1913, 1923, AND 1924, DISTINGUISHING THE PRINCIPAL NATIONALITIES.

Nationality of Vessels.	Number of Passages.			Net Tonnage of Vessels.			Numbers as Percentages of Total.			Tonnages as Percentages of Total.		
	1913.	1923.	1924.	1913.	1923.	1924.	1913.	1923.	1924.	1913.	1923.	1924.
British	2951	2839	2973	12,052,484	14,264,214	14,994,681	58·0	61·5	58·0	60·2	62·8	59·7
Japanese	68	172	149	343,732	986,283	871,529	1·3	3·7	2·9	1·7	4·4	3·4
Dutch	342	451	489	1,287,354	2,178,058	2,488,389	6·7	9·8	9·6	6·4	9·6	9·9
French	256	259	304	927,787	1,294,400	1,497,487	5·0	5·6	5·9	4·6	5·7	6·0
Italian	110	256	378	290,576	1,042,754	1,483,408	2·2	5·6	7·4	1·5	4·6	5·9
Danish	56	64	78	171,848	299,695	344,868	1·1	1·4	1·5	0·9	1·3	1·4
Norwegian	44	87	105	93,313	335,597	367,418	0·9	1·9	2·1	0·5	1·5	1·5
American (U.S.)	8	114	137	7,476	614,128	795,021	0·2	2·5	2·7	—	2·7	3·2
Swedish	33	60	61	122.957	275,264	270,197	0·7	1·3	1·2	0·6	1·2	1·1
Greek	17	20	35	54,560	61,031	131,351	0·3	0·4	0·7	0·3	0·3	0·5
Spanish	26	13	18	75,643	36,718	52,443	0·5	0·3	0·4	0·4	0·2	0·2
German	778	247	350	3,352,287	1,213,691	1,646,872	15·3	5·4	6·8	16·7	5·4	6·6
Austria-Hungarian	246	—	—	845,830	—	—	4·8	—	—	4·2	—	—
Russian	110	23	15	340,595	73,896	62,060	2·2	0·5	0·3	1·7	0·3	0·2
All others	40	16	30	67,422	54,433	104,197	0·8	0·1	0·5	0·3	0·0	0·4
Total	5085	4621	5122	20,033,802	22,730,162	25,109,921	100·0	100·0	100·0	100·0	100·0	100·0

Note.—The above figures include not only Merchant Vessels and Mail Steamers, but also Warships and Transports as well as Gove ment Chartered Vessels.

NUMBER AND NET TONNAGE OF COMMERCIAL VESSELS THAT PASSED THROUGH THE PANAMA CANAL IN THE YEARS ENDED 30TH JUNE, 1918, 1919, 1920, 1921, 1922, 1923, AND 1924, DISTINGUISHING THE PRINCIPAL NATIONALITIES.

NOTE.—Commercial Vessels include all Vessels except those of the United States Government, or chartered by the U.S. Government to carry Government supplies, and Vessels of less than 10 tons measurement.

Nationality.	Number of Vessels.							Net Tonnage of Vessels.						
	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1918.	1919.	1920.	1921.	1922.	1923.	1924.
British	702	607	753	972	935	1,065	1,265	2,529,203	1,915,744	2,760,188	3,978,320	3,795,526	4,892,338	6,097,611
American (U.S.A.)*	567	784	1,129	1,210	1095	1,994	2,947	1,704,040	2,257,342	3,791,088	4,861,761	4,971,509	10,208,536	15,806,899
Norwegian	296	128	106	140	113	147	136	876,024	497,555	397,632	548,227	385,007	507,359	546,633
Japanese	54	87	118	136	189	163	171	238,814	341,064	515,243	613,245	872,466	753,219	815,468
Chilian	96	93	79	63	53	62	47	254,841	253,561	212,000	159,727	150,398	201,411	176,472
Danish	100	79	9	60	53	65	65	272,946	213,534	32,221	236,512	227,473	240,053	245,929
Peruvian	83	64	75	60	60	80	70	208,958	166,956	191,689	157,495	161,930	216,829	189,046
Dutch	48	19	29	50	66	109	102	197,627	88,299	152,535	248,801	293,428	510,970	551,761
French	52	104	60	44	51	56	83	147,805	253,774	114,664	155,889	190,171	252,333	386,640
Spanish	11	5	41	44	9	14	45	24,469	11,066	106,651	117,400	27,264	41,201	172,572
Other Nationalities	60	54	79	113	112	212	299	119,346	126,095	272,133	338,490	342,287	691,537	1,159,847
Totals	2,069	2,024	2,478	2,892	2,736	3,967	5,230	6,574,073	6,124,990	8,546,044	11,415,876	11,417,459	18,605,786	26,148,878

ABOVE AS PERCENTAGES.

	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1918.	1919.	1920.	1921.	1922.	1923.	1924.
British	33·9	30·0	30·4	33·6	34·2	26·8	24·2	38·5	31·3	32·3	34·8	33·3	26·3	23·3
American (U.S.A.)*	27·4	38·7	45·6	41·8	40·0	50·3	56·3	25·9	36·8	44·4	42·6	43·5	54·9	60·5
Norwegian	14·3	6·3	4·3	4·9	4·1	3·7	2·6	13·3	8·1	4·7	4·8	3·4	3·2	2·1
Japanese	2·6	4·3	4·8	4·7	6·9	4·1	3·3	3·6	5·6	6·0	5·4	7·6	4·0	3·1
Chilian	4·7	4·6	3·2	2·2	2·0	1·6	0·8	3·9	4·1	2·5	1·4	1·3	1·1	0·7
Danish	4·8	3·9	0·3	2·1	2·0	1·6	1·2	4·2	3·5	0·4	2·1	2·0	1·3	0·9
Peruvian	4·0	3·2	3·0	2·1	2·2	2·0	1·3	3·2	2·7	2·2	1·4	1·4	1·2	0·7
Dutch	2·3	0·9	1·2	1·7	2·4	2·7	2·0	3·0	1·4	1·8	2·2	2·6	2·7	2·1
French	2·5	5·1	2·4	1·5	1·8	1·4	1·6	2·2	4·2	1·3	1·4	1·7	1·4	1·5
Spanish	0·6	0·3	1·6	1·5	0·3	0·3	0·9	0·4	0·2	1·2	1·0	0·2	0·2	0·7
Other Nationalities	2·9	2·7	3·2	3·9	4·1	5·5	5·8	1·8	2·1	3·2	2·9	3·0	3·7	4·4
Totals	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

* Includes Vessels engaged in the coasting trade of the U.S.A., which is carried on *entirely* by National Ships.

Cargoes (in tons weight) carried in Commercial Vessels that passed through the Panama Canal during the Years ended 30th June, 1918, 1919, 1920, 1921, 1922, 1923, and 1924, distinguishing the Principal Nationalities.

Nationality of Vessels.	Weight of Cargoes carried.						
	1918.	1919.	1920.	1921.	1922.	1923.	1924.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
British	2,615,675	1,876,939	2,830,268	3,738,257	3,329,861	4,929,317	6,051,842
American (U.S.A.)	2,098,277	2,758,886	4,547,140	5,163,025	4,950,519	11,055,150	16,654,435
Norwegian . . .	1,090,823	577,679	404,323	637,887	408,268	704,292	539,101
Japanese . . .	407,399	503,427	726,338	758,617	1,044,515	943,400	935,245
Chilian	153,259	161,310	104,738	61,737	46,182	76,670	107,147
Danish	420,063	325,277	42,533	322,059	272,779	307,876	317,274
Peruvian . . .	143,344	121,524	119,418	105,322	64,370	111,519	102,136
Dutch	233,063	119,297	128,442	216,488	290,573	487,957	573,929
French	159,859	286,812	125,249	132,836	139,463	230,175	407,249
Spanish	35,394	10,047	101,563	143,076	23,701	32,178	67,903
Other Nationalities	174,875	175,393	244,487	319,910	314,679	689,341	1,238,449
Totals . . .	7,532,031	6,916,621	9,374,499	11,599,214	10,884,910	19,567,875	26,994,710

Above as Percentages.

	1918.	1919.	1920.	1921.	1922.	1923.	1924.
British	34·7	27·1	30·2	32·2	30·6	25·2	22·4
American (U.S.A.)	27·9	39·9	48·5	44·5	45·5	56·5	61·7
Norwegian . . .	14·5	8·4	4·3	5·5	3·7	3·6	2·0
Japanese . . .	5·4	7·3	7·7	6·5	9·6	4·8	3·5
Chilian	2·0	2·3	1·1	0·5	0·4	0·4	0·4
Danish	5·6	4·7	0·5	2·8	2·5	1·6	1·2
Peruvian . . .	1·9	1·8	1·3	0·9	0·6	0·6	0·4
Dutch	3·1	1·7	1·4	1·9	2·7	2·5	2·1
French	2·1	4·2	1·3	1·2	1·3	1·2	1·5
Spanish	0·5	0·1	1·1	1·2	0·2	0·2	0·3
Other Nationalities	2·3	2·5	2·6	2·8	2·9	3·4	4·5
Totals . . .	100·0	100·0	100·0	100·0	100·0	100·0	100·0

BRITISH TECHNICAL SOCIETIES.

Belfast Association of Engineers: President, J. H. Chambers; Hon. Treasurer, Douglas B. Marr; Hon. Secretary, T. H. Hurst, A.M.I.E.E.: Address, Shaftesbury Electrical Works, Belfast.

British Association for the Advancement of Science: President, Prof. Horace Lamb, LL.D., F.R.S.; Treasurer, Dr. E. H. Griffiths, F.R.S; General Secretaries, Prof. J. L. Myres, D.Sc., O.B.E., and F. E. Smith, O.B.E., F.R.S.; Secretary, O. J. R. Howarth, O.B.E., M.A.: Address, Burlington House, London, W. 1.

Civil Engineers, Institution of: President, Basil Mott, C.B.; Hon. Secretary, J. H. T. Tudsbery, D.Sc.; Secretary, H. H. Jeffcott, B.A.I., Sc.D.; Telephone, Victoria 4577; Telegrams "Institution, London": Address, Great George Street, Westminster, London, S.W. 1.

Civil Engineers of Ireland, Institution of: President, James T. Jackson, M.A., M.A.I.; Hon. Secretary, L. Chaloner Smith: Address, 35, Dawson Street, Dublin.

Diesel Engine Users' Association: Secretaries, Percy Still and Geoffrey Porter: Address, 19, Cadogan Gardens, London, S.W. 3.

Electrical Engineers, Institution of: President, W. B. Woodhouse; Secretary, P. F. Rowell; Telephone, Gerrard 764; Telegrams, "Voltampere, Phone, London": Address, Savoy Place, Victoria Embankment, London, W.C. 2.

Engineers and Shipbuilders in Scotland, Institution of: President, J. Howden Hume; Secretary, E. H. Parker; Telephone, Central 5181; Telegrams, "Institution, Elmbank Crescent, Glasgow": Address, Elmbank Crescent, Glasgow.

Engineers (Inc.), Society of: President, A. Stewart Buckle: Hon. Treasurer and Hon. Secretary, C. T. Walrond; Secretary, A. S. E. Ackermann; Telephone, Victoria 244; Telegrams, "Windolite, Vic. London": Address, 17, Victoria Street, Westminster, London, S.W. 1.

Iron and Steel Institute: President, Sir Frederick Mills, Bt.; Secretary, G. C. Lloyd; Telephone, Victoria 853; Telegrams, "Irosamente, Sowest, London": Address, 28, Victoria Street, Westminster, London, S.W. 1.

Junior Institution of Engineers (Inc.): President, Sir J. Fortescue Flannery, Bart., M.Inst.C.E., M.I.Mar.E., M.I.N.A., M.I.Mech.E.; Chairman, C. O. Mourant, M.I.Struct.E.; Hon. Treasurer, C. H. Woodfield; Secretary, Herbert G. Riddle; Telephone, Victoria 6968; Telegrams, "Juniorinst, Sowest, London": Address, 39, Victoria Street, Westminster, London, S.W. 1.

Liverpool Engineering Society: President, Professor T. B. Abell, O.B.E., M.Eng., M.Inst.N.A.; Treasurer, Professor E. W. Marchant D.Sc. (Lond.); Hon. Secretary, G. Kenyon Bell, M.Cons.E.: Address, Royal Institution, Colquitt Street, Liverpool.

Manchester Association of Engineers: President, Herbert Bates, O.B.E., M.I.Mech.E.; Treasurer, E. J. Christian, M.I.Mech.E.; Secretary, F. Hazelton; Telephone, City 6645: Address, 16, Albert Square, Manchester.

Marine Engineers (Inc.), Institute of: President, Lord Inverforth, P.C.; Chairman of Council, B. P. Fielden; Hon. Treasurer, Alfred Robertson; Hon. Secretary, J. Adamson; Assistant Secretary, B. C. Curling; Telephone, Avenue 7525; Telegrams, "Gradation, Ald, London": Address, 85-88, The Minories, London, E. 1.

Mechanical Engineers, Institution of: President, William H. Patchell; Hon. Treasurer, F. H. Norwood; Secretary, Brig.-Gen. Magnus Mowat, C.B.E.; Assistant Secretary (General), H. T. Chapman; Assistant Secretary (Technical), J. E. Montgomrey; Telephone, Victoria 4564; Telegrams, "Mech. Parl. London": Address, Storey's Gate, St. James's Park, Westminster, London, S.W. 1.

Metals, Institute of: President, Professor T. Turner, M.Sc., A.R.S.M.; Treasurer, A. E. Seaton, Esq., M.Inst.C.E.; Secretary, G. Shaw Scott, M.Sc.; Telephone, Victoria 2320; Telegrams, "Victoria 2320": Address, 36, Victoria Street, Westminster, London, S.W. 1.

Nautical Research, Society for: Hon. Secretary and Treasurer, Professor Geoffrey Callender, M.A., F.S.A., F.R.Hist.S.: Address, Royal Naval College, Greenwich, London, S.E. 10.

Naval Architects, Institution of: President, His Grace the Duke of Northumberland, C.B.E., M.V.O.; Hon. Treasurer, Sir Charles Ellis, G.B.E., K.C.B.; Secretary, R. W. Dana, O.B.E., M.A.; Telephone, Gerrard 6311; Telegrams, "Sinai, Westrand, London": Address, 5, Adelphi Terrace. London, W.C. 2.

Navy Records Society: President, Lieut.-Col. Sir Frederick G. Kenyon, K.C.B., F.B.A., D.Litt., LL D.; Hon. Treasurer, Sir W. Graham Greene, K.C.B.; Secretary, W. G. Perrin, O.B.E.: Address, Admiralty, London, S.W. 1.

Newcomen Society for the Study of the History of Engineering and Technology: Hon. Secretary, H. W. Dickinson: Address, The Science Museum, South Kensington, London, S.W. 7.

North-East Coast Institution of Engineers and Shipbuilders: President, Tom Westgarth; Secretary, E. W. Fraser-Smith, M.A., A.M.Inst.C.E.; Telephone, Central 689; Telegrams, "Bolbec, Newcastle-on-Tyne": Address, Bolbec Hall, Newcastle-on-Tyne.

Research, Department of Scientific and Industrial: Address, 16, Old Queen's Street, Westminster, London, S.W. 1.—National Physical Laboratory: Director, Sir Joseph Petavel, K.B.E., D.Sc., F.R.S.; William Froude National Tank: Superintendent, G. S. Baker, O.B.E.: Address, Teddington, Middlesex.

Royal Society for the Encouragement of Arts, Manufactures and Commerce: President, Field-Marshal H.R.H. The Duke of Connaught, K.G.; Chairman of Council, Senator G. Marconi, G.C.V.O., LL.D., D.Sc.; Treasurers, Lord Askwith, K.C.B., D.C.L., and Carmichael Thomas; Secretary, G. K. Menzies, M.A.: Address, John Street, Adelphi, London, W.C. 2.

Scientific Society of the Royal Technical College, The: President, J. H. Huntley, M.Inst.E.S.; Treasurer, J. E. Irvine; Secretary, Norman Young: Address, The Royal Technical College, Glasgow.

Structural Engineers, Institution of: President, Major James Petrie, O.B.E., M.Inst.T., F.P.W.I.; Secretary, Captain M. G. Kiddy, F.I.S.A.; Telephone, Victoria 2112; Telegrams, "Coninst, Sowest, London"; Address, Abbey House, Victoria Street, Westminster, London, S.W. 1.

Technical Engineers, Society of: Secretary, R. Hazelton: Address, 102, Belgrave Road, London, S.W. 1.

West of Scotland Iron and Steel Institute: President, E. H. Lewis; Secretary, Douglas A. MacCullum: Address, 93, Hope Street, Glasgow.

COLONIAL AND FOREIGN TECHNICAL SOCIETIES.

AUSTRALIA.

Australasian Institute of Marine Engineers: General Secretary, J. M. Corby: Address, Melbourne, Victoria.

Radio-Telegraphists' Institute of Australasia: President, W. G. Lawrence; General Secretary, S. Toombs: Address, 79–81, Pitt Street, Sydney, N.S.W.

CANADA.

Canadian Engineering Standards Association: Secretary, R. J. Durley: Address, Room 112, West Block, Ottawa, Ontario.

Engineering Institute of Canada: Secretary, Fraser S. Keith: Address, 176, Mansfield Street, Montreal.

National Association of Marine Engineers of Canada: Secretary, W. A. MacDonald: Address, 62, Albert Street, Halifax, N.S.

FRANCE.

Association Technique Maritime: Address, Quai des Grands Augustins 55, Paris.

GERMANY.

Schiffbautechnische Gesellschaft: President, Geheimer Reg. Prof. Dr. Ing. Busley: Address, 2, Schumann Strasse, Berlin, N.W. 7.

HOLLAND.

Koninklijk Institut van Ingenieurs: President, Prof. S. G. Everts; General Secretary, R. A. Van Sandick: Address, Prinsessegracht, 23, The Hague.

ITALY.

Collegio Degli Ingegneri Navali e Meccanici in Italia (College of Naval Architects and Marine Engineers): President, Commander Angelo Scribanti: Address, Palazzo Nuova Borsa 1og, Genoa.

JAPAN.

Japanese Society of Naval Architects: President, Dr. K. Yamamoto, Constructor Vice-Admiral, I.J.N.; Honorary Secretary, Dr. H. Fujishima, M.I.N.A.: Address (Temporary), c/o Engineering College, Imperial University, Tokyo.

Kikaigakkai (Society of Mechanical Engineers): President, Dr. Y. Shima: Address, c/o Tetsudo-Kyokai, Marunsuchi, Tokyo.

UNITED STATES.

American Association for the Advancement of Science: Secretary, Dr. B. E. Livingston: Address, Smithsonian Institution Building, Washington, D.C.

American Association of Engineers: Secretary, C. E. Drayer: Address, 63, East Adams Street, Chicago, Ill.

American Institute of Electrical Engineers: President, H. J. Ryan; Secretary, F. L. Hutchinson: Address, 33, West 39th Street, New York, N.Y.

American Iron and Steel Institute: Secretary, H. H. Cook: Address, 40, Rector Street, New York City.

American Mathematical Society: Secretary, Professor R. G. D. Richardson: Address, Brown University, Providence, R.I.

American Society of Civil Engineers: President, Charles F. Loweth; Secretary, John H. Dunlap: Address, 33, West 39th Street, New York, N.Y.

American Society of Marine Designers: Secretary, B. G. Barnes: Address, 202, Kendrick Avenue, Quincy, Mass.

American Society of Mining and Mechanical Engineers: Secretary, F. F. Sharpless: Address, 29, West 39th Street, New York, N.Y.

American Society of Naval Engineers: President, Capt. J. T. Thompkins, U.S.N.; Secretary, Commander Bryson Bruce, U.S.N.: Address, Bureau of Engineering, Navy Department, Washington, D.C.

American Welding Society: Secretary, J. D. Connelly: Address, 1841, Oliver Building, Pittsburgh, Pa.

Association of Iron and Steel Electrical Engineers: Secretary, J. F. Kelly: Address, 1007, Empire Building, Pittsburg, Pa.

Boston Society of Civil Engineers: Secretary, J. B. Babcock: Address, 715, Tremont Temple, Boston, Mass.

Bureau of Construction and Repair: Address, Navy Department, Washington, D.C.

Bureau of Engineering: Address, Navy Department, Washington, D.C.

Cleveland Engineering Society: Secretary, J. F. Oberlin: Address, 108, Hotel Winton, Cleveland, Ohio.

Coast Artillery School: Manager, Major F. S. Clark, C.A.C.: Address, Fort Monroe, Va.

Cornell Society of Civil Engineers: Secretary, R. W. Gastmeyer: Address, 58, Berwyn Avenue, Cornell E.O., N.J.

Engineering Foundation: Director, Alfred D. Flinn: Address, 29, West 39th Street, New York City.

Engineers' Club of Philadelphia: Secretary, C. E. Billin: Address, 1317, Bruce Street, Philadelphia, Pa.

Engineers' Society of Milwaukee: Secretary, F. H. Dorner: Address, 548, Milwaukee Street, Milwaukee.

Engineers' Society of Western Pennsylvania: Secretary, K. F. Treschow: Address, William Penn Hotel, Pittsburgh, Pa.

Federated American Engineering Societies: Secretary, L. W. Wallace: Address, 26, Jackson Place, Washington, D.C.

Franklin Institute: President, Walton Clark; Secretary, R. B. Owens: Address, 15, South 7th Street, Philadelphia, Pa.

Michigan Engineering Society: Secretary, C. B. Huff: Address, 6017, Grand River Avenue, Detroit, Michigan.

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Radio Engineers, Institute of; Secretary, A. N. Goldsmith: Address, College of the City of New York, 140th Street, New York City.

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United Engineering Society: Secretary, Alfred D. Flinn: Address, 29, West 39th Street, New York.

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Amalgamated Engineering Union: Secretary, A. H. Smethurst: Address, 110, Peckham Road, London, S.E. 15.

Amalgamated Marine Workers' Union: Joint Secretaries, A. Cannon and J. McKinlay: Address, 41, Gower Street, London, W.C. 1.

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Manchester Marine Insurance Association: Chairman, John Speers; Vice-Chairman, J. Brockbank; Secretary, Geo. Lombers; Telephone, Central 1228: Address, Parr's Bank Buildings, 3, York Street, Manchester.

Manchester Steamship Owners' Association: Chairman, T. Fischer; Hon. Secretary, T. Whyman; Telephone, City 2060, Manchester; Telegrams, "Membership, Manchester": Address, 3, Cathedral Street, Manchester.

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Middlesbrough Keel and Lighter Owners' Association: Chairman, G. Eason; Secretary, J. W. Nellist: Address, Court Chambers, Albert Road, Middlesbrough.

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Steamship Mutual Underwriting Association, Ltd.: Chairman, R. G. Westcott; Secretary, J. F. Plincke: Address, 49, Leadenhall Street, London, E.C. 3.

Suez, Compagnie Universelle du Canal Maritime de: President, C. Jonnart; Chairman of London Committee and Vice-President, Lord Inchcape, G.C.M.G., K.C.S.I., K.C.I.E.; Secretary, George E. Bonnet: Address, 3, Whittington Avenue, Leadenhall Street, London, E.C. 3.

Sunderland Shipowners' Society: President, The Earl of Durham; Chairman, Ernest F. Dix; Secretary, J. G. Rutherford: Address, 45 and 46, West Sunniside, Sunderland.

Swansea Chamber of Commerce (Inc.): President, Wm. Morgan; Chairman, Ivor A. Ambrose; Secretary, Henry J. Marshall; Telephone, 2818; Telegrams, "Commerce, Swansea": Address, Chamber of Commerce, Swansea.

Tees and Hartlepool Shipbuilders' Association: Chairman, Herbert Taylor; Secretary, Allan Kennedy: Address, "Kinnoull," Dovecot Street, Stockton-on-Tees.

Thames Estuary and Coast Sailing Barge Mutual Insurance and Protection Association, Ltd.: Chairman, A. W. Daniels; Secretary, J. F. Plincke: Address, 49, Leadenhall Street, London, E.C. 3.

Thames Nautical Training College: Chairman, The Rt. Hon. Lord Inchcape of Strathnaver, G.C.M.G., K.C.S.I., K.C.I.E.; Captain Superintendent, Captain M. B. Sayer, C.B.E., R.N.R.; Head Master, T. R. Beatty, M.A.; Secretary, F. H. Stafford: Address, 72, Mark Lane, London, E.C. 3.

Trade Facilities Act Advisory Committee: Telephone, City 3151; Address, 3, Bank Building, Princes Street, London, E.C. 4.

Trinity House, Honourable Corporation of: Master, Field-Marshal H.R.H. The Duke of Connaught, K.G.; Deputy-Master, Captain Sir H. Acton Blake, K.C.M.G., K.C.V.O.: Secretary, M. K. Smith, O.B.E.: Address, Tower Hill, London, E.C. 3.

Tyne Shipbuilders' Association: Secretary, James Cameron: Address, Bolbec Hall, Westgate Road, Newcastle-on-Tyne.

Underwriters and Insurance Brokers in Glasgow, Association of: Chairman, Hugh M. Parker; Secretary, William Stewart: Address, Underwriters' Rooms, Royal Exchange Buildings, Glasgow.

United Kingdom Mutual Steamship Assurance Association, Ltd.: Chairman, Sir Walter Runciman, Bt.; Managers, T. R. Miller & Son; Telephone, Avenue 2552; Telegrams, "Mutuality, Stock, London": Address, 24, St. Mary Axe, London, E.C. 3.

United States Shipping Board Emergency Fleet Corporation, European Division: Vice-President, Joseph E. Sheedy: London Address, Bush House, Aldwych, W.C. 2.; Telephone, Central 7750-6.

Wear Shipbuilders' Association: Chairman, T. H. Patterson; Secretary, F. J. Carlyle: Address, York Chambers, St. John Street, Sunderland.

West of England Light Shipbuilders' Association: President, F. C. Spink; Secretary, J. A. S. Hassal: Address, 6, Lord Street, Liverpool.

West of England Mutual War Risks Association, Ltd.: Managers, John Holman and Sons: Address, 1, Lloyd's Avenue, London, E.C. 3

West of England Steamship Owners' Protection and Indemnity Association, Ltd.: Chairman, Sir Shadforth Watts; Vice-Chairman, Sir John B Wimble; Managers, John Holman & Sons: Address, 1, Lloyd's Avenue, London, E.C. 3.

COLONIAL AND FOREIGN SHIPPING ASSOCIATIONS.

AUSTRALIA.

Australasian Steamship Owners' Federation: Chairman, G. W. Turner; Secretary, H. M. Adams: Address, Steamship Buildings, 509, Collins Street, Melbourne.

Merchant Service Guild of Australasia: Secretary, W. G. Lawrence: Address, 79–81, Pitt Street, Sydney, N.S.W.

United Service Institution of New South Wales: Secretary, Lieut. Frederick Daniell: Address, 12–14, O'Connell Street, Sydney, N.S.W.

BELGIUM.

Antwerp Chamber of Commerce: Address, Local de la Bourse, Antwerp.

Antwerp Ship Repairers' Federation: Chairman, David Petrie; Secretary, Willy M. Speleers: Address, General Buildings, 14, Place de Meir, Antwerp.

Fédération Maritime: Address, Courte rue des Claires, 2, Antwerp.

International Shipping Federation, Ltd. (Belgian Branch): General Secretary, J. F. Drory: Address, 7, Quai Van Dyck, Antwerp.

Union des Armateurs Belges: President, Léon Dens; Hon. Secretary, Emile Deckers: Address, Longue Rue Neuve, 132, Antwerp.

CANADA.

American Association of Port Authorities: Address, Montreal.

Shipping Federation of Canada (Inc.): President, R. W. Reford; Manager and Secretary, Thomas Robb: Address, 218, Board of Trade Building, Montreal.

CHINA.

China Coastwise Association: Address, Hong Kong.

DENMARK.

Assuranceforeningen Skuld. (Danish Branch): Address, Amaliegade 29A, Copenhagen.

Baltic and White Sea Conference: President, Theodore E. Salvesen; Manager, Jacob Olsen: Address, 29A, Amaliegade, Copenhagen, K.

Dansk Dampskibsrederiforening (Danish Steamship Owners' Association): President, Chr. Sass; Manager, E. Maegaard: Address, Amaliegade 29A, Copenhagen.

International Shipping Federation, Ltd. (Danish Branch): General Secretary, A. O. Andersen: Address, Amaliegade 29A, Copenhagen.

FRANCE.

Bureau des Longitudes (Publishers of the French Nautical Almanac): Address, Palais de l'Institut, 3, Rue Mazarine, Paris.

Bureau Veritas: President, C. J. Lefebvre; Managing Director, A. Berlhe de Berlhe; General Secretary, A. F. Bertrand: Address, 31, Rue d'Offémont, Paris.

Comité Central des Armateurs de France: Chairman, Denis Pérouse; General Secretary, Paul de Rousiers: Address, 73, Boulevard Haussmann, Paris (8e).

Compagnie Universelle du Canal Maritime de Suez: Address, 1, rue d'Astorg, Paris, (8e).

GERMANY.

Bremer Reederverein: Address, Haus Schütting, Bremen.

Germanischer Lloyd: Chairman, Prof. Carl Pagel; Address, Alsenstrasse 12, Berlin, N.W. 40.

International Shipping Federation, Ltd., The, (German Branch): General Secretary, Dr. Paul Ehlers: Address, Adolphsbrücke 9, Hamburg.

Reederverein für den Bezirk der Handelskammer zu Flensburg: Address, Flensburg.

Reedereiverein zu Lübeck: Address, Breitestrasse 6, Lübeck.

Rostocker Reederverein: Address, Rostock.

Schutzverein Deutscher Reeder (Protection Association of German Shipowners): Chairman, H. M. Gehrekens; Manager, J. L. Bartelsen: Address, Alsterstrasse 1, Hamburg 1.

Verband Deutscher Reeder: President, Staatsminister a. D. Graf. von Rhoedern; General Manager, Dr. iur. Hans Rehmke: Address, Adolphsbrücke 9 (III), Hamburg.

Verein Hamburger Reeder: Address, Mönckebergstrasse 27 II, Hamburg.
Verein Stettiner Reeder: Address, Börse, Stettin.
Wirtschaftsausschuss der Deutschen Reederei: President, Dr. h. c. Sh. Heineken; Managing-President. Staatsminister a. D. Graf. von Rhoedern: Address, Adolphsbrücke 9 (III), Hamburg.

HOLLAND.

Bond van Werkgevers in de Koopvaardy (Union of Employers in the Merchant Marine): Address, Rotterdam.
Centrale van Koopvardy-officierin (Central Union of Merchant Marine Officers): Address, Rotterdam.
International Shipping Federation, Ltd. (Dutch Branch): Secretary, J. Stakenburg: Address, Parklaan, 8, Rotterdam.
Nederlandsche Reedersvereeniging: President, Dr. H. J. Knottenbelt; Secretary, J. C. P. Krayenhoff van de Leur; Assistant Secretary, Dr. F. W. A. de Kock van Leeuwen: Address, Stationsweg 135, The Hague.
Scheepvaart Vereeniging "Nord" ("North" Shipping Association): Address, Amsterdam.
Scheepvaart Vereeniging "Zuid" ("South" Shipping Association): Address, Rotterdam.

INDIA.

United Service Institution of India: Address, Simla.

ITALY.

Federazione Armatori Italiani: Secretaries, Comm. G. Trucco and Avv. G. V. Perosio: Address, Via XX Septembre 19–4, Genoa.
Federazione degli Armatori Liberi Italiani: President, Emanuele V. Parodi; Secretary, Avv. Carlo Raimondo: Address, Salita S. Caterina 4, Genoa (6).
Registro Italiano: President, Gr. Uff. Prof. Camillo Supino; Director, Comm. Ing. D. Barricelli; Secretary, Ing. C. Doerfles: Address, Piazza della Borsa 7, Trieste.

JAPAN

Japanese Merchant Marine Officers' and Engineers' Association: Secretary, Yojiro Tsudzuki: Address, No. 180, 8 Chome, Shimoyamate—Dori, Kobe.
Nippon Shipowners' Association: President, Y. Ito; Managing Director, Z. Kamiya: Address, 32, Akashi Machi, Kobe.
Teikoku Kaiji Kyokai (Imperial Japanese Marine Corporation): Chairman, Baron G. Shiba; Secretary, S. Shinohara: Address, 444, Kaijo Building, Marunouchi, Tokio.

NORWAY.

Assuranceforeningen Skuld.: President, Otto Thoresen; Managing Directors, Sir Anton Poulsson, K.B.E., and Einar Poulsson; Address, Carl Johansgate 1, Postbox 129, Oslo.
Det Norske Veritas: Chairman, Sir Anton Poulsson, K.B.E.; Secretary, N. Hagness: Address, P.O. Box 82, Oslo.
Nordisk Skibsrederforening: President, A. F. Klaveness; Managing Director, J. Jantzen: Address, Drammensveien, 21, Oslo.
Norges Rederforbund: President, H. Westfal-Larsen; Secretary, W. Klaveness: Address, Stortingsgaten, 16, Oslo.
Skibsbyggerienes Landsforening: Address, Schestedsgt, 3, Oslo.

SPAIN.

"Almanaque Nautico" (The Spanish Nautical Almanac). *See* Observatorio de Marina.
Asociación de Navieros de Bilbao: President, Sir Ramón de la Sota, K.B.E.; Secretary, Don Antonio Arroyo: Address, Ibañez de Bilbao, 22, Bilbao.
Observatorio de Marina (Publishers of the Spanish "Almanaque Nautico"); Director, Señor Leon Herrero: Address, San Fernando, Cadiz.

SWEDEN.

International Shipping Federation, Ltd. (Swedish Branch): General Secretary, O. A. Nordborg: Address, Sveriges Redareforening, Kungsportsavenyen, 1, Gothenburg.

Svenska Teknologföreningen adv. för Skeppsbyggnadskonst (Association of Swedish Engineers and Architects—Section for Naval Architecture): Address, Stockholm, 16.

Sveriges Allmänna Sjöfartsförening (Swedish General Shipping Association); Secretary, C. E. Landberg: Address, Hantverkargatan 32, Stockholm.

Sveriges Ångfartygs Assurans Förening: Address, Gothenburg.

Sveriges Redareförening (Swedish Shipowners' Association): Managing Director, O. A. Nordborg: Address, Kungsportsavenyen, 1, Gothenburg.

Sveriges Segelfartygsforening: Address, Ombudsmannen, Raa pr. Raus.

UNITED STATES.

American Association of Port Authorities: President, J. H. Walsh; Secretary, Tiley S. McChesney: Address, Room 200, New Orleans Court Building, New Orleans, Louisiana

American Bureau of Shipping: President, Stevenson Taylor; Secretary. J. W. Cantillion: Address, 50, Broad Street, New York.

American Manufacturers' Export Association: Secretary, M. B. Dean: Address, 160, Broadway, New York City.

American Marine Association: President, Colonel E. A. Simmons; Secretary, K. Warren Heinrich: Address, 15, Park Row, New York, N.Y.

American Steamship Owners' Association: President, Alfred Gilbert Smith; Vice-President and General Manager, Winthrop L. Marvin: Address, 11, Broadway, New York.

American Steamship Owners' Mutual Protection and Indemnity Association (Inc.): Chairman, Alfred Gilbert Smith; Secretary, J. H. de G. Evans: Address, 3, South William Street, New York, N.Y.

Maritime Association of the Boston Chamber of Commerce: Chairman, Edward E. Blodgett; Manager, Frank S. Davis: Address, 177, Milk Street, Boston 9, Mass.

Master Boiler Makers' Association: Secretary, H. D. Vought: Address, 26, Cortlandt Street, New York City.

National Association of Engine and Boat Manufacturers: Secretary, R. R. Hand: Address: 29, West 39th Street, New York.

National Merchant Marine Association: President, Hon. Joseph E. Ransdell: Secretary, Mr. Henry C. Wiltbank: Address, Munsey Building, Washington, D.C.

National Rivers and Harbours Congress: Secretary, S. A. Thompson: Address, 824, Colorado Building, Washington, D.C.

Nautical Almanac: Director of the Almanac, Captain W. S. Eichelberger (Math), U.S.N.: Address, United States Naval Observatory, Washington, D.C.

Pacific American Steamship Association: President, Captain Robert Dollar; Secretary-Treasurer, J. P. Williams: Address, 336, Battery Street, San Francisco, California.

Port of New York Authority: Secretary, Wm. Leary: Address, 11, Broadway, New York.

Shipowners' Association of the Pacific Coast: President, F. J. O'Connor: Secretary-Treasurer, W. F. Sullivan: Address, 336, Battery Street, San Francisco, California.

United States Shipping Board Emergency Fleet Corporation: Address, Washington, D.C.

THE STEAMSHIP SERVICES OF THE WORLD.

All lines run return journeys in reverse order to services given, except where otherwise stated.

AFRICA, EAST.

British India Line; from London and Middlesbrough to Principal Ports of East Africa (*passengers and cargo*); from Bombay to Mombasa, Zanzibar, Dar-es-Salaam, Beira, Delagoa Bay (*mails, passeugers and cargo*).
Clan Line; from Glasgow, Liverpool and Newport to Madagascar (*passengers and cargo*).
Compagnie Havraise Péninsulaire de Navigation à Vapeur; from Havre and Marseilles to Madagascar (East Coast), Réunion and Maurice Isle (*passengers and cargo*); from Havre, Bordeaux, and Marseilles to Madagascar (West Coast) and Mozambique (*passengers and cargo*).
Deutsche Ost-Afrika Linie; from Hamburg, Antwerp, and Southampton to Chief East African Ports (*passengers and cargo*).
Hall Line; from Glasgow and Liverpool to all East African Ports (*passengers and cargo*).
Hamburg-Amerika Linie Africa-Dienst; from Hamburg, Antwerp, and Southampton to Chief Ports of East Africa (*passengers and cargo*).
Hamburg-Bremer-Afrika Linie A.G.; from Hamburg, Antwerp, and Southampton to Chief East African Ports (*passengers and cargo*).
Harrison Line; from Glasgow and Birkenhead to Principal Ports of East Africa (*cargo*).
Houlder Brothers and Co., Ltd.; from London to Chief East African Ports (*passengers and cargo*).
Houston Line; from Continent, Middlesbrough, London, Glasgow, Liverpool, and United States to Chief East African Ports (*cargo*).
Prince Line; from New York to Delagoa Bay, Beira, etc. (*cargo*) (*viâ* Cape).
Prince Line; from New York to East African Ports, and vice versâ (*cargo*).
Union-Castle Line; from London and Southampton to all East African Ports and Mauritius (*passengers, mail, and cargo*).
Woermann-Linie, Aktien-Gesellschaft; from Hamburg, Antwerp, and Southampton to Chief East African Ports (*passengers and cargo*).

AFRICA, SOUTH.

Aberdeen Line; from London and Plymouth to Durban, Cape Town, and Port Elizabeth (*passengers and cargo*).
British Africa Shipping and Coaling Co., Ltd.; from London and Plymouth to Durban and Cape Town (*passengers and cargo*).
British India Line; from Bombay to Durban (*passengers, mails, and cargo*).
Clan Line; from Glasgow, Liverpool, and Newport to Cape Town, Port Elizabeth and Durban (*passengers and cargo*).
Deutsche Ost-Afrika Linie; from Hamburg, Rotterdam, and Southampton to Chief South African Ports (*passengers and cargo*).
Ellerman and Bucknall Steamship Co., Ltd.; from United Kingdom (*weekly cargo services, also regular passenger service*); from Australia (*fortnightly cargo sailings*); from New York (*joint weekly cargo sailings*).
Furness, Withy and Co., Ltd. *See* Prince Line.
Hall Line; from Glasgow and Liverpool to Cape Town, Mossel Bay, Algoa Bay, East London, Natal, Delagoa Bay, and Mauritius (*cargo*).
Hamburg-Amerika Linie Africa-Dienst; from Hamburg, Rotterdam, and Southampton to South African Ports (*cargo and passengers*).
Hamburg-Bremer-Afrika Linie A.G.; from Hamburg, Bremer, Rotterdam, and Southampton to Chief South African Ports (*passengers and cargo*).

Harrison Line; from Birkenhead, Glasgow, and Newport to Capetown, Mossel Bay, Algoa Bay, East London, Natal, Delagoa Bay, Beira, and Mauritius (*cargo*).
Harrison Line; London and Middlesbrough to Natal, Delagoa Bay, and Beira.
Houlder Brothers and Co., Ltd.; from London to Cape Town, Port Elizabeth, and Durban (*passengers and cargo*).
Houston Lines; from United Kingdom and from United States (*both cargo services, carrying a few passengers*).
Natal Line of Steamers, Bullard, King and Co., Ltd.; from London, Middlesbro and Continent to Natal and East African Ports (*passengers and cargo*).
Peninsular and Oriental Service to Australia; from London to Adelaide, Melbourne, and Sydney *viâ* Cape Town (*passengers, one class only, mails and cargo*).
Prince Line; from New York to South African Ports, and vice versâ (*cargo*).
Shaw, Savill and Albion Co., Ltd.; from London to Australia, *viâ* the Cape of Good Hope (outwards, *general cargo;* homewards, *a large amount of meat and dairy produce in cold storage*).
Smith and Son, Sir W. Reardon; Cardiff to South African Ports.
Union-Castle Line; from London and Southampton to Cape Town, Mossel Bay, Port Elizabeth, East London to Natal (*passengers, mails, and cargo*).
Wilh. Wilhelmsen; from Norway, Sweden, Denmark, and Finland, to chief South African Ports (*cargo*).
White Star Line; from Liverpool to Australia, calling at Cape Town (*passengers and cargo*).
Woermann-Linie, Aktien Gesellschaft; from Hamburg, Rotterdam, and Southampton to Chief South African Ports (*passengers and cargo*).

AFRICA, WEST.

African Steamship Co.; from Liverpool and London to principal West African Ports (*passengers and cargo*).
British and African Steam Navigation Co., Ltd.; from Liverpool and Rotterdam to principal West African Ports (*passengers and cargo*).
Deutsche Ost-Afrika Linie; from Hamburg, Rotterdam, Antwerp, and Southampton to Chief West African Ports (*passengers and cargo*).
Elder, Dempster and Co. Ltd.; from Liverpool, London, and Rotterdam to principal West African Ports (*passengers and cargo*).
Hamburg-Bremer-Afrika Linie A.G.; from Hamburg, Rotterdam, Antwerp, and Southampton to Chief West African Ports (*passengers and cargo*).
Holt and Co. (Liverpool), Ltd.; from Liverpool to principal West African Ports (*passengers and cargo*).
Houston Lines; from London, Glasgow, and Liverpool (*cargo*).
Union-Castle Line; from London to Lobito Bay, Walfish Bay, and Luderitz Bay, etc.

AMERICA, CENTRAL.

Blue Funnel Line. *See* Alfred Holt and Co.
Canadian Pacific Railway Co.; from Montreal and Quebec (summer), St. John (winter), to Havana, Cuba, *viâ* Boston (*passengers and cargo*).
Canadian Government Merchant Marine, Ltd.; Montreal to Havana, Cuba (*cargo*); Montreal to Nassau, Kingston (Ja.), Jamaica and Belsize (B.H.) (*passengers and cargo*); Montreal to Barbados, Trinidad, and British Guiana (*cargo*). During the winter these services operate from Halifax, N.S.
Clyde Steamship Co.; from New York to Santo Domingo City and Azua, *viâ* Turks Island, calling at Monte Cristo, Puerto Plata, Samana, Sanchez, La Romana, and Macoris (*passengers and cargo*).
Compagnie Générale Transatlantique; Havre to Central American Ports (*cargo*).
Cuban Line (Ernest Bigland and Co., Ltd., Managers); from Antwerp, Hull, and London to Cuba and Mexico (*cargo and few passengers*).
Davies Steamship Co., W. R.; from London to Panama (*passengers and cargo*).
Elders and Fyffes, Ltd.; from Avonmouth, Garston, and Rotterdam to Bermuda, Jamaica, Barbadoes, Trinidad, St. Simon, Panama, Spanish Honduras, and Colombia (*passengers only*).
Ellerman and Bracknell Steamship Co., Ltd.: Calcutta, and Rangoon to West Indies and Cuba (*regular joint service*).
Furness Line; from New York to Bermuda (*passengers and cargo*); New York to West Indies (*passengers and cargo*); from New York to Grenada, Trinidad and Demerara (*passengers and cargo*); from Glasgow and Manchester to Colon and Balboa, proceeding thence to Los Angelos, San Francisco, and Vancouver (*passengers and cargo*).

Furness, Withy and Co., Ltd. *See* Furness Line.

Hamburg-Amerika Line; from Hamburg to Cuba and Mexico(*passengers and cargo*); from Hamburg to West Indies (*passengers and cargo*); from Hamburg to West Coast Ports, *viâ* Panama (*passengers and cargo*).

Harrison Line; from Glasgow to West Indies and Demerara (*cargo*); from London to West Indies and Demerara (*cargo*); from Swansea, Glasgow, and Liverpool to North Pacific Ports, *viâ* Panama Canal (*cargo*); from Liverpool to West Indies and Mexico (*cargo*).

Holt and Co., Alfred; from Liverpool (part loading at Glasgow, Bristol Channel Ports, Hamburg, and Bremen) to the Straits Settlements, Philippines, China, Japan, Korea, East Siberia, Kingston (Jamaica), Pacific Coast, United States, and Canada, passing through the Panama Canal (*passengers and cargo*).

Houston Lines; from River Plate Ports to United States and Canada, calling at Cuba (*cargo service, carrying a few passengers*).

Hugo Stinnes Linien; from Hamburg to Cuba and Mexico (*passengers and cargo*).

Larrinaga Line; from Liverpool to Havanna and other Cuban Ports; from Houston and Galveston to Liverpool and Manchester.

Leyland Line; from Liverpool, London, and Manchester to Panama (*passengers and cargo*).

New York and Porto Rico Steamship Co. *See* Porto Rico Line.

New Zealand Shipping Co., Ltd.; from London and Liverpool through the Panama Canal to New Zealand and Australia (*passengers and cargo*).

Nourse Line; from Calcutta to Cuba, P. & O.

Panama Rail Road Steamship Co.; from New York, Port au Prince (Hayti), to Cristobal (Canal Zone, Panama) (*passengers and cargo*).

Porto Rico Line; from New York to San Juan, Ponce, and Mayaguez (*freight and passengers*); from New Orleans and Mobile to San Juan, Ponce, and Mayaguez (*freight*).

Royal Mail Steam Packet Co.; from London and Hull to West Indies (*cargo only*); from Hull and London to Jamaica (*cargo only*); from Hull and London to Hayti and Domingo (*cargo only*); from Rotterdam and London to Colon and Central American Pacific Ports (*passengers and cargo*); from Hull, Bremen, and Rotterdam to Havana and Galveston (*passengers, mails, and cargo*); from St. John, N.B., and Halifax, N.S., to Bermuda, West Indies, and Demerara (*passengers, mails and cargo*).

Shaw, Savill and Albion Co., Ltd.; from London through the Panama Canal to New Zealand; this service is run in conjunction with the White Star Line (*passengers and cargo*).

Stinnes Linien. *See* Hugo Stinnes Linien.

Wilh. Wilhelmsen; from Norway, Sweden, Denmark, and Finland to Cuba, Vera Cruz, and Tampico (*cargo and a few passengers*).

White Star Line, jointly with Shaw, Savill and Albion Co., Ltd.; from London to New Zealand *viâ* Panama Canal (*passengers and cargo*).

AMERICA, SOUTH.

"Artus" Line. *See* Hugo Stinnes Linien.

Booker Line; from Liverpool to Demerara (British Guiana) direct (*passengers and cargo*).

Booth Line; from Antwerp, Hamburg, Havre, Liverpool, Lisbon, London, Madeira and Oporto to principal North Brazilian Ports, and Iquitos, Peru; also from New York to all principal Brazilian Ports (*passengers and cargo*).

British and Argentine Steam Navigation Co., Ltd.; from Liverpool to River Plate Ports (*passengers and cargo*).

Compagnie Générale Transatlantique to Pacific Coast Ports (*cargo*).

Compania Naviera Sota y Aznar (Spanish Line); from Hamburg to Rio de Janeiro, Santos, Monte Video and Buenos Aires.

Cornborough Shipping Line, Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Davies Steamship Co., W. R.; from Liverpool to principal South American Ports (*cargo*).

Donaldson South American Line; from Glasgow, Liverpool, and London to Monte Video and Buenos Aires—also by transhipment to other River Plate Ports (*refrigerated cargo*).

Furness Line; from New York (*viâ* Grenada and Trinidad) to Demerara.

Furness-Houlder Argentine Lines, Ltd.; from London and Liverpool to chief Ports of Argentine and Uruguay (*refrigerated cargo and a few first-class passengers*).

Furness, Withy and Co., Ltd. *See* Furness Line, Prince Line, and Furness-Houlder Argentine Lines.

Grace Lines; from New Orleans to Ports of Equador, Peru, and Chile (*passengers, cargo, and mails*).
Hall Line; from Calcutta to River Plate Ports (*cargo*).
Hamburg-Amerika Line; from Hamburg to Brazil and La Plata Ports (*passengers and cargo*).
Hamburg-Südamerikanische Dampfschifffahrts-Gesellschaft; from Hamburg to Brazil, Uruguay, and Argentina (*passengers, cargoes and mails*).
Harrison Line; Liverpool and South Wales to Brazil (*cargo*).
Henderson and Co., Ltd.; from Glasgow to principal South American Ports (*cargo*).
Holland and Co., Ltd., Arthur; from Newport to principal South American Ports (*cargo*).
Houlder Brothers and Co., Ltd.; from Antwerp, London, Liverpool, and Bristol Channel to Monte Video, Buenos Aires, and Rosario (Outwards, *general cargo and passengers*; Homewards, *frozen and chilled meat, dairy produce, general cargo, and passengers*).
Houston Lines; from Glasgow and Liverpool to River Plate; from United States to River Plate; from Canada to River Plate; from West Indies to River Plate (*all cargo services, carrying a few passengers*).
Hugo Stinnes Linien; from Hamburg to Portuguese Ports, Pernambuco, Monte Video, Buenos Aires, and Rosario (in association with the "Artus" Line, Danzig) (*passengers and cargo*).
Kaye, Son and Co., Ltd.; from Liverpool to principal South American Ports (*cargo*).
Koninklijke Hollandsche Lloyd; from Amsterdam to Buenos Aires, calling *en route* at Southampton, Cherbourg, La Corunna, Vigo, Leixoes, Lisbon, Las Palmas, Pernambuco, Bahia, Rio de Janeiro, Santos, and Monte Video (*passengers, mails, and freights*); from Hamburg *viâ* Rotterdam, Antwerp, Spain to Argentina (*cargo*); from Hamburg to Amsterdam, Antwerp, Portugal to Brazil (*cargo*).
Lamport and Holt; from Liverpool, Glasgow, and Manchester to Brazil, *viâ* Portugal; from Liverpool and Glasgow to the River Plate, *viâ* Spain; from Middlesbrough, Hamburg, Antwerp, London, and Cardiff to Brazil and the River Plate; from New York to North Brazil; from New York to Central and South Brazil; from New York to River Plate Ports; from New Orleans to Brazil and River Plate; from Glasgow, Liverpool, and Havre to the West Coast Ports of South America (*cargo*); from New York to Brazil and the River Plate, calling at the West Indies (*passengers*).
Leeds Shipping Co., Ltd.. *See* Smith and Sons, Ltd., Sir Wm. Reardon.
MacIver Line; from London and Liverpool to principal River Plate Ports without transhipment (*cargo*).
Nelson, Ltd., H. and W.; from London to Buenos Aires, calling on the outward journey at Boulogne, Corunna, Vigo, Las Palmas, G.C., Rio de Janeiro, and Monte Video, and on the homeward journey at Monte Video and Las Palmas; from Liverpool to Buenos Aires, calling at Monte Video, and at Las Palmas on the homeward voyage (*cargo, passengers, and mails*).
Oakwin Steam Ship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.
Prince Line, Ltd.; from London, Middlesbrough, and Antwerp to River Plate Ports (*cargo*), and vice versâ; from New York to River Plate Ports (*cargo*); from New York to Brazil (*cargo*), and vice versâ.
Ritson, F. and W.; from Glasgow, Liverpool, and London to principal South American Ports (*cargo*).
Roland-Linie, Aktien Gesellschaft; from Bremen and Hamburg to Chile, Peru, and Ecuador (*passengers and cargo*).
Rotterdam-Zuid Amerika Lijn; from Hamburg, Rotterdam, and Antwerp to Buenos Aires, Monte Video, Santos, Rio de Janeiro, Bahia, and Pernambuco, calling at Bilbao, Santander, and Vigo (*cargo, carrying a few passengers*).
Royal Mail Steam Packet Co.; from Southampton to Pernambuco, Bahia, Rio de Janeiro, Santos, Monte Video, and Buenos Aires (*mails, passengers, and cargo*); from Liverpool to Rio de Janeiro, Santos, and Buenos Aires, calling at Cherbourg, Coruna, Leixoes, and Lisbon (*mails, passengers and cargo*); from London, Newport, and Swansea to Pernambuco, Bahia, Rio de Janeiro, Santos, and Rio Grande do Sul (*cargo only*).
St. Just Steamship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.
Shaw, Savill and Albion Co., Ltd.; from London to New Zealand, proceeding on the outward journey *viâ* the Panama Canal, and on the homeward journey *viâ* Cape Horn, calling at Monte Video and Teneriffe (*cargo, and meat and dairy produce in cold storage on homeward voyage*).
Smith and Sons, Ltd., Sir Wm. Reardon; from United Kingdom and Continent to River Plate Ports (*cargo*).
Sota y Aznar; from Hamburg, Rotterdam, Antwerp, and Bilbao to Pernambuco, Bahia, Rio de Janeiro, Santos, Monte Video, and Buenos Aires (*cargo*).

Stinnes Linien. *See* Hugo Stinnes Linien.

Toyo Kisen Kaisha; from Hong Kong, Moji, Kobe, Yokohama, Honolulu, and Hilo to San Francisco, Portland, Los Angeles, Salina Cruz, Balbao, Callao, Mollendo, Arica, Iquique, and Valparaiso (*passengers and mails*).

Wilh. Wilhelmsen (Wilhelmsen Steamship Line); from New York to Brazil and River Plate Ports (*cargo and refrigerated stores—fortnightly*).

AUSTRALIA AND NEW ZEALAND.

Aberdeen Line; from London and Plymouth to Melbourne, Sydney, Brisbane and Fremantle; calling at Teneriffe and Cape Town (outward), and Durban, Cape Town and Teneriffe (homeward) (*passengers and cargo*).

Adelaide Steamship Co., Ltd.; between Queensland Ports, Sydney, Newcastle, Melbourne, Adelaide, Albany, and Fremantle (*cargo and stock*); between Port Adelaide, Spencer's Gulf, and West Coast Ports (*passengers, cargo, and stock*).

Anderson, Green and Co., Ltd. *See* Orient Line.

Australian Steamships Pty., Ltd.; between Melbourne, Sydney, Newcastle, Brisbane, Queensland Ports, Adelaide, and other South Australian Ports, Albany, Fremantle, Geraldton, and West Australian Ports, Geelong, Portarlington, Warrnambool, Portland, etc. (*passengers and cargo*).

Blue Funnel Line. *See* Holt and Co., Alfred.

British India Line; from London to Fremantle, Adelaide, Melbourne, Sydney, and Brisbane; from Gulf of Mexico to Australian and New Zealand Ports, from Calcutta to Australian Ports (*passengers and cargo*).

Burns, Philp and Co., Ltd.; between Sydney, Queensland Ports, Darwin, Jarva, and Singapore; between Sydney, Lord Howe Island, Norfolk Island, and New Hebrides; between Sydney, Brisbane, Solomon Islands, and New Britain; between Sydney, Queensland, Papua, and Rabaul; between Sydney and New Britain direct (*mails, passengers, and cargo*).

Canadian-Australian Line. *See* Canadian Pacific Railway Co.

Canadian Government Merchant Marine, Ltd.; from Vancouver (*cargo*); from Montreal (*cargo*). During the winter months the Service from Montreal operates from Halifax, N.S.

Canadian Pacific Railway Co., in conjunction with the Canadian-Australian Line; from Vancouver to Honolulu, Suva, Fiji, Auckland, N.Z., and Sydney, Australia (*passengers and cargo*).

Commonwealth and Dominion Line; from London, Middlesbrough, Hull, and Antwerp to Auckland, Wellington, Lyttelton, and Dunedin, N.Z., *viâ* the Panama Canal; from London, Middlesbrough, Hull, Antwerp, and Hamburg to Melbourne, Sydney, Newcastle, N.S.W., Brisbane, Hobart and Launceston *viâ* Cape. From New York to Australia and New Zealand *viâ* the Panama Canal. Homewards from Australia and New Zealand to U.K. and Continent (*cargo and passengers*).

Commonwealth Government Line of Steamers; from Antwerp, Bristol, Glasgow, Hull, Liverpool, London, Middlesbrough, and Newport to Fremantle, Perth, Adelaide, Hobart, Launceston, Melbourne, Sydney, Newcastle (N.S.W.), and Brisbane (*cargo*); from London to Fremantle, Adelaide, Melbourne, Sydney, and Brisbane, *viâ* Port Said and Colombo (*passengers and cargo*); from United Kingdom Ports to Brisbane, Sydney, and Melbourne *viâ* Panama (*cargo*).

Cornborough Shipping Line, Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Cunard Line; from Southampton, Liverpool, Belfast, Queenstown, Cherbourg and Hamburg *viâ* U.S.A. or Canada to all the chief Ports of Australia and New Zealand (*passengers*).

Eastern and Australian Steamship Co. Ltd. to Adelaide, Hobart, Melbourne, and Fremantle (*passengers and cargo*).

Ellerman and Bucknall Steamship Co., Ltd.; to London, United Kingdom and Continent, also United States (*regular cargo services*); from New York (*frequent* (*joint cargo services*).

Federal Steam Navigation Co., Ltd.; from London and West Coast Ports of Great Britain to Principal Ports of Australia (*passengers and cargo*).

Hall Line; from Liverpool to principal Australian Ports (*passengers and cargo*).

Henderson and Co., Ltd.; from Glasgow and Liverpool to principal Australian Ports (*cargo*).

Holt and Co., Alfred; from Glasgow and Continental Ports to Adelaide, Melbourne, Sydney and Brisbane (homeward calling at Liverpool and London in addition); from Singapore to West Australian Ports (*passengers and cargo*).

Leeds Shipping Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Liverpool Line to Australia; from Liverpool to Fremantle, Adelaide, Melbourne, Sydney, Newcastle, Brisbane, Auckland, Wellington, Lyttelton and Dunedin; from Manchester to same ports (*passengers and cargo*).

London Line; from Bristol, Glasgow, Liverpool, and London to principal Australian Ports (*passengers and cargo*).

McIlwraith, McEacharn's Line; from Sydney to Melbourne, Adelaide, Albany, and Fremantle (*passengers and cargo*).

New Zealand Shipping Co., Ltd., from London and West Coast ports of Great Britain, *viâ* the Panama Canal, to principal Australian and New Zealand Ports (*mails, passengers, and cargo*).

Oakwin Steamship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Orient Line to Australia; from Tilbury to Fremantle, Adelaide, Melbourne, Sydney, and Brisbane, calling at Gibraltar, Toulon, Naples, Port Said, and Colombo, also on the return journey at Plymouth. At certain seasons of the year the vessels call at Hobart, Tasmania (*passengers, cargo, and mails for Commonwealth of Australia*).

Peninsular and Oriental Service to Australia; from London to Adelaide, Melbourne, and Sydney, *viâ* Cape Town (*passengers—one class only—mails and cargo*).

Peninsular and Oriental Steam Navigation Company; fortnightly service from London to Fremantle, Adelaide, Melbourne, and Sydney, calling at Gibraltar, Marseilles and Port Said, or Port Said and Port Sudan, Aden, and Colombo, and homewards also at Plymouth (*passengers, mails, and cargo*).

St. Just Steamship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Shaw, Savill and Albion Co., jointly with White Star Line; from London to Port Chalmers *viâ* Panama Canal, calling at Auckland, Wellington, and Lyttleton (*passengers, mails, and cargo*); from London to New Zealand, proceeding on the outward journey *viâ* the Panama Canal, and on the return journey *viâ* Cape Horn, and calling at Monte Video and Teneriffe (*cargo*).

Shire Line; from Glasgow to principal Australian Ports (*cargo*).

Smith and Sons, Ltd., Sir Wm. Reardon; from United Kingdom and Continental Ports to New Zealand (*cargo*).

Trinder, Anderson and Co.; from London to principal Australian Ports (*cargo*).

Turnbull, Martin and Co.; from London and West Ports of Great Britain to principal Australian and New Zealand Ports (*passengers and cargo*).

White Star Line; from Liverpool to Sydney, calling at Cape Town, Albany, Adelaide, and Melbourne (*passengers and cargo*); from Liverpool to Australia, direct (*cargo*); from Liverpool to New Zealand, direct (*cargo*), jointly with Shaw, Savill and Albion Co., Ltd.; from London to Port Chalmers *viâ* the Panama Canal, calling at Auckland, Wellington, and Lyttleton (*passengers, mails, and cargo*).

Workman, Arbuckle and Mackinson; from London to principal Australian Ports (*cargo*).

Wilh. Wilhelmsen: from Norway, Sweden, Denmark, Finland, Hamburg, and Antwerp to principal Australian Ports (*cargo*).

BALTIC AND NORTH SEA.

American-Hawaiian Steamship Co.; from Los Angeles, Portland, San Francisco, Seattle, and Tacoma to Hamburg, calling at Glasgow, Havre, Liverpool, and London (*fortnightly cargo sailings*).

Bachke and Co.; from Hull, Trondhjem and West Norwegian Ports to Aberdeen, Grangemouth, Hull, Grimsby, London, Manchester, Bristol, Swansea, Bremen, Antwerp and French Ports (*cargo*).

Becker and Co, Ltd.; from East and West Coast Ports of the United Kingdom to principal Baltic Ports (*passengers and cargo*).

Bergenske Dampskibsselskab, Det.; from Glasgow, Manchester, Middlesbrough and Newcastle to Principal Ports of Norway and Sweden (*passengers and cargo*).

Brodin, Erik; from London to Principal Ports of Norway and Sweden (*passengers and cargo*).

Burton, Smart and Orford, Ltd. *See* Scandia Lines.

Cook and Son, John; from Aberdeen and Granton to principal Baltic Ports (*passengers and cargo*).

Cormack and Co., James; from Aberdeen, Dundee, Grangemouth, Leith, Montrose, and Methil to Riga, Windau and other Latvian Ports; occasional steamers to Archangel (*cargo and few passengers*).

Compagnie Générale Transatlantique: Havre to Memel and Dantzig (*passengers and cargo*).

Cornborough Shipping Line, Ltd. *See* Smith and Sons, Ltd., Sir Wm Reardon.

Currie Line. *See* Leith, Hull and Hamburg Steam Packet Co.

Ellerman's Wilson Line; from Grimsby, Hull, Liverpool, London, Newcastle and Swansea to Principal Ports of Baltic, Norway, and Sweden (*cargo*).

Finland Line ; from Liverpool to Helsingfors (*cargo*).

Finland Steamship Co., Ltd. *See* Finska Angfartygs Aktiebolaget.

Finska Angfartygs Aktiebolaget ; from Hull to Copenhagen, Helsingfors, Hangö, and Abo (*passengers and cargo*) ; from Antwerp to Finnish Ports (*passengers and cargo*) ; from Stettin and Lübeck to Helsingfors and Hangö (*passengers and cargo*) ; from Stockholm to Helsingfors and Abo (*passengers and cargo*) ; from Dantzig, Riga and Reval to Helsingfors or Hangö (*passengers and cargo*). The foregoing lines carry mails for Germany, Sweden, and Esthonia. From Hull, London, Liverpool, and Manchester to Finnish Ports (*cargo*) ; from Rotterdam, Antwerp, Northern France, and Copenhagen to Finnish Ports (*cargo*).

Forenede Dampskibsselskab., Det. ; from Hull, London and Manchester to Ports of Scandinavia (*passengers and cargo*).

Glen and Co. ; from Glasgow to Holland and Belgium (*cargo*).

Head Line and Lord Line ; to Belfast and Dublin, from Petrograd, Reval, Pernau, and Riga (*chiefly cargo*) ; between Belfast, Dublin, Cork, Londonderry and Hamburg, Amsterdam, Antwerp, Rotterdam and Ghent and Bremen (*chiefly cargo*).

Leeds Shipping Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Leith, Hull and Hamburg Steam Packet Co., Ltd. ; from Leith to Hamburg (*passengers and cargo*) ; from Grangemouth and Dundee to Hamburg (*cargo*) ; from Aberdeen and Middlesbro' to Hamburg (*cargo*) ; from Leith to Bremen (*cargo*) ; from Leith to Copenhagen (*cargo*).

Lord Line. *See* Head Line and Lord Line.

Oakwin Steamship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Preston Steam Navigation Co., Ltd. ; from East and West Coast Ports of the United Kingdom to Principal Ports of Baltic and Norway (*passengers and cargo*).

Royal Mail Steam Packet Co. ; from London, Hamburg, Antwerp, Hull, and Swansea to Brazil (*cargo only*) ; from Hull, Bremen, and Rotterdam to Havana and Galveston (*passengers, mails, and cargo*) ; from Hamburg, Southampton, and Cherbourg to New York (*passengers, mails, and cargo*) ; from Hamburg, Rotterdam, Antwerp, and London to North Pacific Ports, *viâ* Panama Canal (*passengers, mails, and cargo*).

St. Just Steam Ship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Salvesen and Co., Chr. ; from Leith to Gothenburg (*cargo*) ; from Grangemouth to Drontheim, calling at Stavanger, Bergen, Aalesund, and Christiansund (*cargo*).

Salvesen and Co., J. T. ; from Grangemouth to principal Baltic Ports (*cargo*).

Scandia Lines ; from Hamburg to London (8-*day freight service*) ; from London to Gothenburg, Christiania, and Copenhagen (10-*day freight service*).

Smith and Sons, Ltd., Sir William Reardon ; from New York, Philadelphia, and Baltimore to Bremen and Hamburg (*cargo*) ; from New York, Philadelphia, and Baltimore to Rotterdam and Hamburg (*cargo*).

Stott and Co., Ltd., W. H. ; from London and Manchester to principal Scandinavian Ports (*cargo*).

West Hartlepool Steam Navigation Co., Ltd. ; from West Hartlepool and Hamburg.

CANADA.

Anchor-Donaldson Line ; summer service from Glasgow to Quebec and Montreal (*passengers and cargo*) ; winter service, from Glasgow to St. John, N.B., Halifax, N.S., and Portland, Me. (*passenger and cargo*).

Becker and Co., Ltd. ; from East and West Coast Ports of the United Kingdom to Quebec (summer), and St. John, N.B. (winter) (*cargo*).

Cairns, Noble and Co., Ltd. ; from Calais, Hull, Middlesbro', Leith, and Dundee to Montreal and Portland, Maine (*cargo*) ; from Mediterranean Fruit Ports to St. John, N.B., and Montreal.

Canada Steamship Lines, Ltd. ; from Montreal (summer), and St. John, N.B. (winter), to Newfoundland (*passengers and cargo*) ; from Port Arthur to Chicoutimi, calling at Duluth, Fort William, Sault Ste. Marie, Sarnia, Port Colborne, Hamilton, Toronto, Kingston, Brockville, Prescott, Cornwall, Montreal, Quebec, Murray Bay, and Tadousac (*passengers and cargo*).

Canadian Government Merchant Marine, Ltd. ; Montreal to London (*cargo*) ; Montreal to Swansea and Cardiff (*cargo*). (During the winter months all these services operate from St. John, N.B.) Vancouver to London and Antwerp (*cargo*) ; Vancouver to Avonmouth (*cargo*).

Canadian Pacific Steamships, Ltd. (*passengers, freight, and mails*) ; from Liverpool, Glasgow, Belfast, Southampton, Antwerp, Cherbourg, Hamburg and Queenstown to Quebec and Montreal in summer, and to St. John, N.B., in winter (*freight only*) ; from London, Havre and Bristol to Montreal in summer, and St. John, N.B., in winter.

Compagnie Général Transatlantique ; Havre, Plymouth, and Bordeaux to Atlantic and Pacific Coast Ports (*cargo*).
Cunard Line ; from Southampton, Liverpool, London, Belfast, Bristol, and Cherbourg to Quebec and Montreal (*passengers and cargo*) ; Southampton, Liverpool, London, Queenstown, Cherbourg and Hamburg to Halifax N.S. (*passengers and cargo*).
Dominion Line ; from Bristol and Liverpool to Quebec (summer), and St. John, N.B. (winter) (*passengers and cargo*).
Donaldson Brothers, Ltd. *See* Anchor-Donaldson Line.
Ellerman and Bucknall Steamship Co., Ltd. ; from India, homewards only *fortnightly cargo*).
Furness Line ; from Liverpool to St. John's and Halifax (*passengers and cargo*) ; from London to Montreal (*cargo*) ; from London to Halifax (*cargo*) ; from London to Saint John (*cargo*).
Furness, Withy and Co., Ltd. *See* Furness Line.
Head Line and Lord Line ; to Belfast, Cork, Dublin, Hamburg, Londonderry, and Rotterdam from Baltimore, Galveston, Montreal, New Orleans, Quebec, and St. John, N.B. (*chiefly cargo*).
Houston Lines ; from River Plate ; from India and Far East (*both cargo services, carrying a few passengers*).
International Transport Services, Ltd. (County Lines) from Montreal (summer), St. John, N.B. (winter) to Havre, Rotterdam and Hamburg (*cargo only*).
Lord Line. *See* Head Line and Lord Line.
Manchester Liners, Ltd. ; from Manchester to Quebec (summer), and St. John, N.B (winter) (*passengers and cargo*).
New York, Newfoundland and Halifax S.S. Co., Ltd. ; from St. John's, Newfoundland, Halifax, Nova Scotia, and New York (*passengers, mails, and cargo*).
Preston Steam Navigation Co., Ltd. ; from East and West Coast Ports of the United Kingdom to Quebec (summer), and St. John, N.B. (winter) (*cargo*).
Royal Mail Steam Packet Co. ; from Bermuda, West Indies, and Demerara, British Guiana to St. John, N.B., and Halifax, N.S. (*passengers, mails, and cargo*) ; from Hamburg, Rotterdam, Antwerp, and London to North Pacific Ports, *viâ* Panama Canal (*passengers, mails, and cargo*).
Smith and Son, Sir W. Reardon ; Cardiff to Canada.
White Star Dominion Line ; from Liverpool to Quebec and Montreal during summer season ; from Liverpool to Halifax and Portland, Me., during winter season (*passengers and cargo*) ; and from Southampton to Halifax.

NEWFOUNDLAND.

Furness, Withy and Co., Ltd. ; from Liverpool to St. John's, Halifax, Nova Scotia, and Boston (*passengers and cargo*).

CHINA AND JAPAN.

Ben Line Steamers, Ltd. ; from Antwerp, Leith, London, and Middlesbrough to the Straits Settlements, China, and Japan (*cargo and a few passengers*).
Blue Funnel Line. *See* Holt and Co., Alfred.
British India Line ; from Calcutta to Straits, China and Japan (*passengers and cargo*).
Canadian Government M.M., Ltd. ; from Vancouver to Kobe and Tokyo (*cargo*).
Canadian Pacific Railway Co. ; from Vancouver to Yokohama, Kobe, Nagasaki, Shanghai, Manila, and Hong Kong (*passengers and cargo*).
China Navigation Co., Ltd. ; between Hong Kong and the Chief Ports of China, Siberia, Japan, Korea, Indo-China, Siam, Straits Settlements, East Indies, and Philippine Islands (*passengers and cargo*).
Cunard Line ; from Bristol, Liverpool, London, and Queenstown to Principal Ports of China and Japan (*passengers and cargo*).
Ellerman and Bucknall Steamship Co., Ltd. ; from New York and Gulf Ports (*fortnightly cargo services*) ; from German, Dutch and French Ports (*monthly cargo and regular passenger services*).
Furness, Withy and Co., Ltd. *See* Prince Line.
Glen Line and Shire Line ; from London to Yokohama, calling at Genoa, Port Said, Penang, Port Swettenham, Singapore, Hong Kong, Shanghai, Kobe, and Nagasaki (*passengers and cargo*).
Holt and Co., Alfred ; from Liverpool (part loading at Glasgow, Bristol Channel Ports, Hamburg and Bremen) to China, Japan and Korea (*passengers and cargo*).
Hugo Stinnes Linien ; from Hamburg, Bremen, Antwerp, Rotterdam to Port Said, Colombo, Singapore, Hong Kong, Shanghai, Kobe, Yokohama, Tientsien.

Java-China-Japan Lyn; from the Principal Ports of the Netherland East Indies to the Philippine Islands, China and Japan (*passengers and cargo*).
Nippon Yusen Kaisha; from Yokohama, *via* China, Straits Settlements, Colombo, Suez, and Marseilles to London (*passengers and cargo*).
Peninsular and Oriental Line; from London to Straits Settlements, China and Japan (*mails, passengers and cargo*) (fortnightly).
Prince Line; from New York to Japan, China, Philippines *via* Panama Canal; from China, Philippines, Java, and Straits Settlements to Boston, New York, Philadelphia, Baltimore *via* Suez (*cargo*).
Rickmers-Linie; from Antwerp and Hamburg to Singapore, Manila, Hong Kong, Shanghai, Dalny, Kobe, Yokohama, and Vladivostock (*freight*).
Shire Line. *See* Glen Line and Shire Line.
Smith and Son, Sir W. Reardon; Cardiff to Japan.
Wilh. Wilhelmsen; from Norway, Sweden, Denmark, Finland, Hamburg, and Antwerp to principal ports of China and Japan (*cargo*).

FRANCE (NORTHERN), BELGIUM, ETC

American-Hawaiian Steamship Co.; from Los Angeles, Portland, San Francisco, Seattle, and Tacoma to Antwerp, Hamburg, and Havre, calling at Glasgow, Liverpool, and London (*fortnightly cargo services*).
Bennett Line; from Goole and London to Amsterdam, Rotterdam, Calais, Dunkirk, and Hamburg (*cargo*).
Bristol Steam Navigation Co., Ltd.; from Bristol, Plymouth, Swansea and Gloucester to Amsterdam, Rotterdam, and Antwerp, and from Hamburg to Gloucester (*cargo*).
British Rhineland Navigation and Transport Co., Ltd. *See* Neptune Line.
Brussels Steamship Co., Ltd.; from London to Brussels (*cargo*).
Burnham Shipping Co., Ltd.; from Cardiff to Antwerp, Rotterdam, and Hamburg (*cargo*).
Burton, Smart and Orford, Ltd. *See* Neptune Line; and Smart's Continental Line.
Compagnie Générale Transatlantique; from London to Bordeaux, Nantes, and La Pallice (*passengers and cargo*).
Constantine (R. A.) and Donkin, Ltd; from Middlesbrough to Calais, Havre, Antwerp, Rotterdam, and Amsterdam (*passengers and cargo*)
Cork Steam Ship Co., Ltd.; from Liverpool, Manchester, and Southampton to Amsterdam, Rotterdam, Dunkirk, Antwerp, and Ghent; from Glasgow to Antwerp and Ghent; from Belfast to Ghent (*cargo and passengers*).
Cunard Line; from Liverpool, Manchester, Glasgow, and Swansea to Havre, St. Malo and Dieppe (*cargo*).
Dens and Co., Ltd.; from London to Havre (*cargo*).
Ellerman and Bucknall Steamship Co., Ltd.; from Australia.
Ensign Shipping Co., Ltd.; from Hull and London to Amsterdam, Rotterdam, and Hamburg (*cargo*).
Furness, Withy and Co., Ltd.; from Middlesbrough to chief Continental Ports (*cargo*).
General Steam Navigation Co., Ltd.; from East Coast Ports of England to Hamburg, Amsterdam, Rotterdam, Harlingen, Ostend, Ghent, Antwerp, Dunkirk, Havre, Charente (*cargo*); Bordeau (*passengers and cargo*).
Gibson and Co., Ltd., George; from Leith, Grangemouth, Dundee and Aberdeen to Antwerp, Rotterdam, Amsterdam, Hamburg, Rouen, Dunkirk and Ghent (*cargo*).
Great Western Railway; from Fishguard and Weymouth to Waterford, Rosslare, Guernsey and Jersey (*passengers and cargo*).
Harrison, Ltd., John; from London to Havre (*cargo*).
Head Line and Lord Line; Belfast, Cork, Dublin, and Londonderry to and from Amsterdam, Antwerp, Dunkirk, Hamburg, Ghent, Bremen, and Rotterdam (*chiefly cargo*).
Holland Steamship Co., Ltd.; from London to Dutch Ports (*passengers and cargo*).
Hull and Netherlands Steamship Co., Ltd.; from Hull to Rotterdam, Amsterdam and Harlingen (*passengers and cargo*).
Hutchinson, Ltd., J. P.; from West Coast Ports of England to Rouen, Nantes, Bordeaux and Hamburg (*cargo*).
Kaye, Son and Co., Ltd.; from London to North French Ports (*cargo*).
Lancashire and Yorkshire Railway; from Hull to Dutch Ports (*passengers and cargo*).
Limerick Steamship Co., Ltd.; from Limerick and Cork to Dunkirk, Calais, Havre, Rotterdam, Amsterdam, and Antwerp (*passengers and cargo*).

London and North-Eastern Railway (Great Central Section); from Grimsby to Antwerp, Hamburg and Rotterdam (*passengers and cargo*). (Great Eastern Section); from Harwich to Hook of Holland, Antwerp and Rotterdam (*cargo only*); from Harwich to Zeebrugge (*passengers—summer season only*).
Lord Line. *See* Head Line and Lord Line.
Marine Mercantile Co., Ltd.; from East Coast Ports of England to Rotterdam, Antwerp, Amsterdam, and Havre (*cargo*).
Neptune Line; from London to Rotterdam, Cologne, and other Rhine Ports (*bi-weekly freight service*); from Hull, Goole, King's Lynn, and other U.K Ports to Rotterdam, Cologne, and other Rhine Ports (*weekly freight service*).
Ocean Belgian Steam Navigation Co., Ltd. *See* Dens and Co.
Park, Ltd., R. and J.; from London to North French Ports (*cargo*).
Rankin and Son, James; from Leith and Grangemouth to Dutch Ports (*cargo*).
Royal Mail Steam Packet Co.; from Liverpool and Southampton to French, Spanish, and Portuguese Ports to Madeira, Las Palmas, Teneriffe, St Vincent (C.V.), Brazil, Uruguay, and Argentina (*passengers, mails, and cargo*); from London, Hamburg, Antwerp, Hull, and Swansea to Brazil (*cargo*); from Hamburg, Antwerp, Rotterdam, and London to North Pacific Ports, *viâ* Panama Canal (*passengers, mails, and cargo*); from Hamburg, Southampton, and Cherbourg to New York (*passengers, mails, and cargo*).
Smart's Continental Lines; from London to Antwerp, Boulogne, Havre, and Rouen (*bi-weekly freight service*).
Walford Lines, Ltd.; from U.K. Ports to France, Belgium and Holland.
Wilsons and N.E.R. Shipping Co., Ltd.; from Hull to Dunkirk, Ghent, Antwerp and Hamburg.
Zeeland Steamship Co., Netherland's Royal Mail Line; from Folkestone to Flushing (*daily day service, mails, cargo and passengers*).

INDIA, BURMAH AND CEYLON.

Anchor Line; from Glasgow and Liverpool, to Bombay, etc.
Anderson, Green and Co., Ltd. *See* Orient Line.
Anchor-Brocklebank and Well Lines; from Glasgow and Liverpool (*fortnightly service, passengers and cargo*); to Calcutta direct (*cargo*); from Hamburg, Rotterdam, Antwerp, Middlesbro' and London to Port Said, Colombo, Madras, and Calcutta (*cargo*).
Asiatic Steam Navigation Co., Ltd.; from Calcutta to Chittagong and Rangoon; from Calcutta to Rangoon and Moulmein; from Calcutta to Bombay *viâ* Ceylon, calling at Coast Ports; from Calcutta, Rangoon, and Madras to Port Blair (Andaman Islands) (*mails and passengers in all cases*).
Bibby Line; from Liverpool and London to Marseilles, Port Said, Port Sudan, Colombo and Rangoon (*passengers and cargo*).
Blue Funnel Line. *See* Holt and Co., Alfred.
Bombay and Persia Steamship Steam Navigation Co ; between Indian and Red Sea Ports and Persian Gulf.
British India Line; from London and Middlesbrough to Calcutta, Bombay, and Madras (*passengers and cargo*); coasting to all principal Ports in Japan, China, Straits, India, Burma, Ceylon, and Persian Gulf from Calcutta and/or Bombay (*passengers and cargo*).
City Line; from Glasgow and Liverpool to Principal Ports of India (*passengers and cargo*).
Clan Line; from Glasgow, Liverpool, and Newport to Calcutta and Madras (*passengers and cargo*).
Cunard Line; from Bristol, Liverpool, London, and Queenstown to Bombay, Madras, Calcutta, and Rangoon (*mails, passengers, and cargo*).
Ellerman and Bucknall Steamship Co., Ltd.; from New York (*regular passenger and cargo services*).
Hall Line; outward services: from Liverpool to Bombay and Karachi, *viâ* Suez Canal (*passengers and cargo*); from Liverpool to Marmagao and Malabar Coast Ports, calling at Lisbon, Bombay, and for Karachi (*passengers and cargo*): these vessels sometimes load at Newport, Glasgow, and Manchester and occasionally call at Marseilles and Naples. Homeward services: from Bombay to Marseilles and Liverpool (*passengers and cargo*); from Karachi to Marseilles and Liverpool (*passengers and cargo*); from Madras Coast to Marseilles, London, and Liverpool (*cargo*); from Malabar Coast to Marseilles, London and Liverpool (*cargo*); from Rangoon to Marseilles and Liverpool (*cargo*); from Rangoon to Alexandria and Liverpool (*cargo*); from Colombo to Marseilles, London, and Liverpool (*cargo*).
Harrison Line; from Liverpool, Newport and Swansea to Calcutta (*cargo*).

Henderson and Co.; from Glasgow and Liverpool to Calcutta and Madras (*cargo*).
Holt and Co., Alfred; from Liverpool (*passengers and cargo*).
Houston Line: from Canada (*cargo services, carrying a few passengers*).
Mogul Steamship Co.; from Birkenhead to Calcutta (*cargo*).
Orient Line; from Tilbury the vessels call at Colombo, on their way to Australia, and also on the return voyage (*passengers, cargo, and mails for Commonwealth of Australia*).
Peninsular and Oriental Line; from London and Marseilles to Bombay and Colombo, calling at Port Said and Aden (*mails, passengers, and cargo*) (weekly); from London to Colombo and Calcutta, calling at Malta (occasionally), Port Said and Aden (*passengers and cargo*) (usually fortnightly).
Smith and Son, Sir W. Reardon; Cardiff to Indian Ports.
Turner and Co. *See* Asiatic Steam Navigation Co., Ltd.
Topham, Jones and Railton, Ltd.; from London to Calcutta, Madras, Bombay, and Colombo (*cargo*).
Wilh. Wilhelmsen; from Norway, Sweden, Denmark, Finland, Hamburg and Antwerp to Principal Ports of India and Ceylon (*cargo*).

THE MEDITERRANEAN, PORTUGAL, AND SPAIN.

African Steamship Co.; from Liverpool to principal Mediterranean Ports (*passengers and cargo*).
Anchor Line; from Liverpool to Gibraltar and Port Said (*passengers*); fortnightly service.
Anderson, Green and Co., Ltd. *See* Orient Line.
Armstrong, Lord and Co.; from Ports on East Coast of United Kingdom to principal Mediterranean Ports (*cargo*).
"Artus" Line. *See* Hugo Stinnes Linie.
Bibby Line; from Liverpool and London to principal Mediterranean Ports (*passengers and cargo*).
Bland Line; from Gibraltar to Tangier and Casablanca (*mail, passenger and cargo service*) weekly; to Melilla and Oran, fortnightly; to Ceuta, Tetuan, Larache, Kehitra, Rabat, Mazagan, Saffii and Mogador (*passenger and cargo service*).
British India Line; from London and Middlesbrough to principal Mediterranean Ports (*passengers and cargo*).
Burnham Shipping Co., Ltd.; from Cardiff to Marseilles, Algiers, Tangier, and Gibraltar (*passengers and cargo*).
Compagnie des Messageries Maritimes; from Port St. Louis to Marseilles, Bizerta, Alexandria, Port Said, Beyrouth, Tripoli, Caiffa, and Jaffa (*cargo*).
Compagnie Générale Transatlantique, Ltd.; Marseilles to Algiers, Tunis, Oran, Philippeville, Bona and Bizerta (*passengers, cargo, and mails*).
Compagnie Havraise Péninsulaire de Navigation à Vapeur; from Havre, Dunkirk, and Rouen to Algeria (*passengers and cargo*).
Compañia Transatlantica (Royal Mail Line of Steamers); from Liverpool to Barcelona, Cadiz, Corunna, Cartagena, Lisbon, Azores, and Vigo (*passenger, freight, and mails*).
Compañia Transmediterránea; from Cadiz to Canary Islands; from Algeciras to Ceuta; from Algeciras and Cadiz to Tangier (*passengers, cargo and mails*).
Cunard Line; from Liverpool, Manchester and Swansea to Gibraltar, Genoa, Leghorn, Naples, Palermo, Messina, Catania, Corfa, Brendisa, Bari, Gruz, Ancona, Venice and Trieste; from Liverpool, Manchester, Glasgow and Swansea to Gibraltar, Oran, Algiers, Malta, Patras, Piræus, Syra, Volo, Salonica, Smyrna, Constantinople, Bourgas, Varna, Canstanza, Sulina (*cargo*).
Davies Steamship Co., W. R.: from U.K. Ports (*cargo*).
Dens and Co., Ltd.; from Newcastle-on-Tyne to principal Mediterranean Ports.
Deutsche Ost-Afrika Linie; from Hamburg, Antwerp, and Southampton to Chief West African Ports (*passengers and cargo*).
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Ellerman's Wilson Line; from Hull to Tangier and Algiers (*passengers and cargo*).

Furness Line; from New York to Piræus, Patras, Salonica, Constantinople, Bulgarian and Danube Ports, Smyrna and Alexandria (*cargo*).
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McAndrews and Co., Ltd.; from London, Liverpool, Glasgow, Hull, Swansea, Antwerp, and Hamburg to Lisbon, Gibraltar and the Principal Ports of Spain (*cargo and a few passengers*).
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Shire Line. *See* Glen Line and Shire Line.
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Blue Funnel Line. *See* Holt and Co., Alfred.
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Commonwealth Government Line of Steamers; from all Australian Ports to Java and Singapore (*cargo*).
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Furness, Withy and Co., Ltd. *See* Prince Line.
Glen Line and Shire Line; from London to Yokohama, calling at Genoa, Port Said, Penang, Port Swettenham, Singapore, Hong Kong, Shanghai, Kobe, and Nagasaki (*passengers and cargo*).
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Osaka Shosen Kaisha; from Hamburg, Antwerp, Rotterdam, London, Marseilles, and Port Said to Singapore, Hong Kong, Shanghai, Moji, Kobe, and Yokohama (*mails and passengers*).
Parker, Ltd., Huddart. *See* Huddart Parker, Ltd.
Peninsular and Oriental Line; from London and Marseilles to the Straits Settlements, China, and Japan, *viâ* Port Said, Aden, and Colombo (*mails, passengers, and cargo*) (fortnightly).
Prince Line; from New York to Japan, China, and Philippines *viâ* Panama Canal; from China, Philippines, Java, and Straits Settlements to Boston, New York, Philadelphia, and Baltimore *viâ* Suez (*cargo*).
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Stinnes Linien, Hugo. *See* "Konferenz-Linie."

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UNITED STATES OF AMERICA.

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Blue Funnel Line. *See* Holt and Co., Alfred.
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Furness Philadelphia Transatlantic Line; London to Philadelphia (*cargo and passengers*).
Furness Line; from United Kingdom to Vancouver and North Pacific Ports (*cargo and passengers*).

Furness, Withy and Co., Ltd. *See* Furness-Prince Line, Prince Line, Johnston Line, Warren Line, and Furness Philadelphia Trans-Atlantic Line.

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Red Star Line Service *See* International Navigation Co., Ltd.

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St. Just Steam Ship Co., Ltd. *See* Smith and Sons, Ltd., Sir Wm. Reardon.

Smith and Sons, Ltd., Sir Wm. Reardon; from Liverpool and London to New York, Philadelphia, and Baltimore; from Bremen and Hamburg to New York, Philadelphia, and Baltimore; from Rotterdam and Hamburg to New York, Philadelphia, and Baltimore (*all cargo services*).

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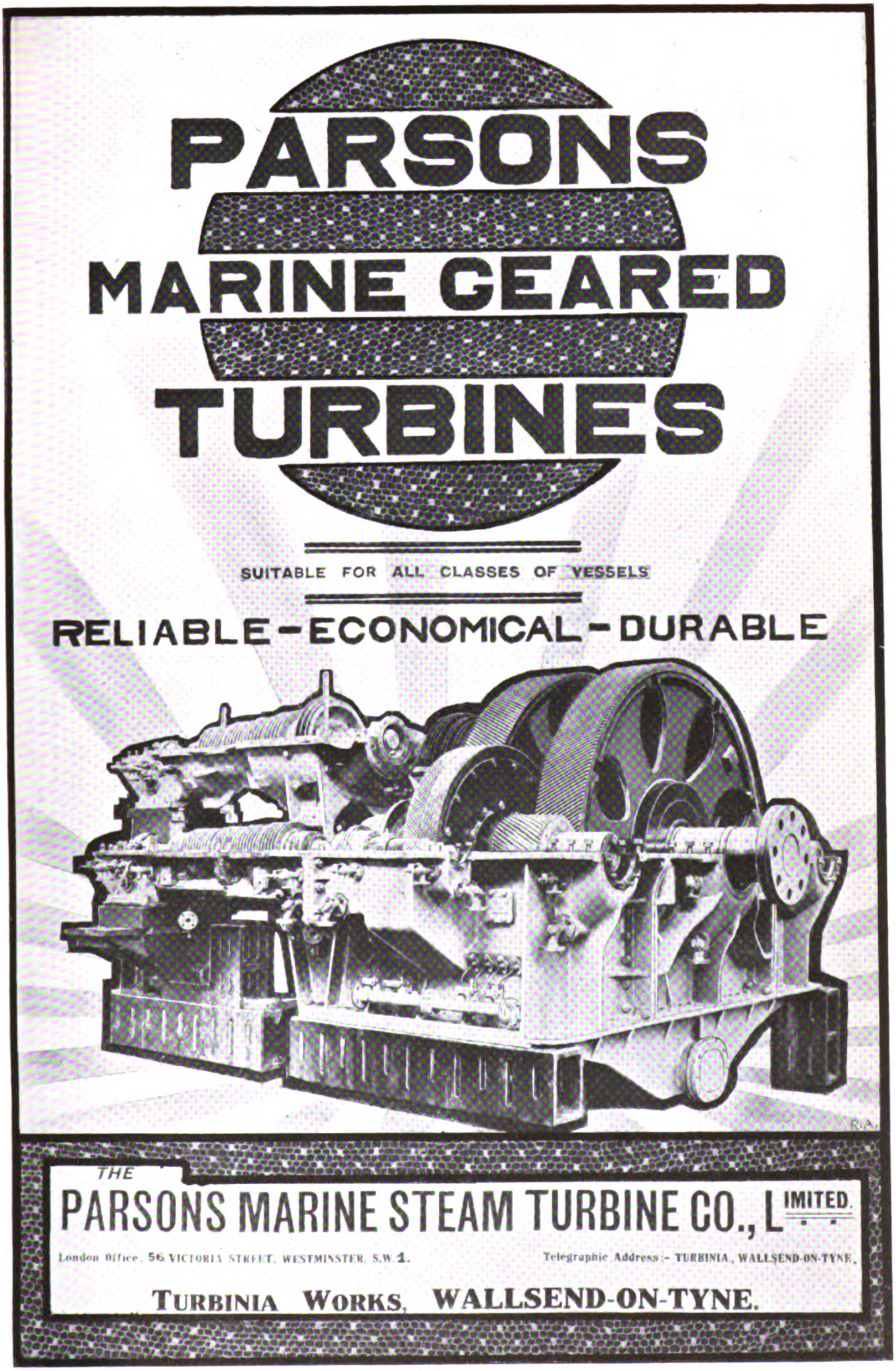
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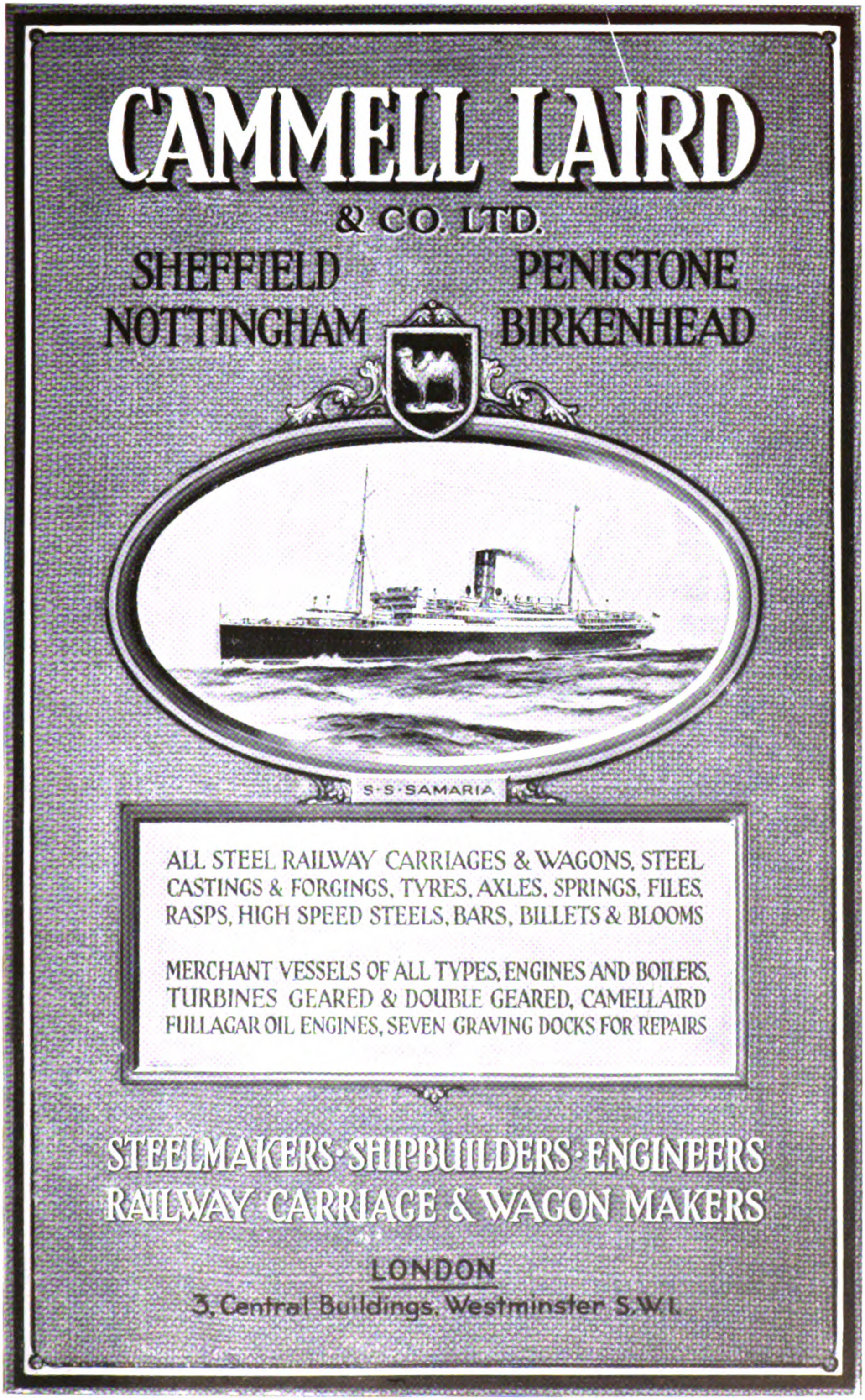
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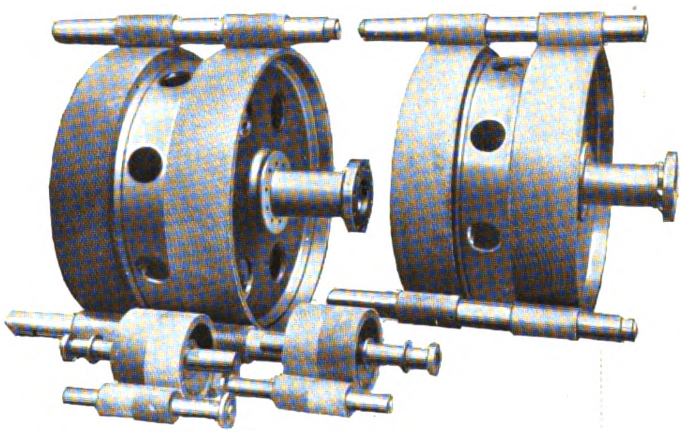

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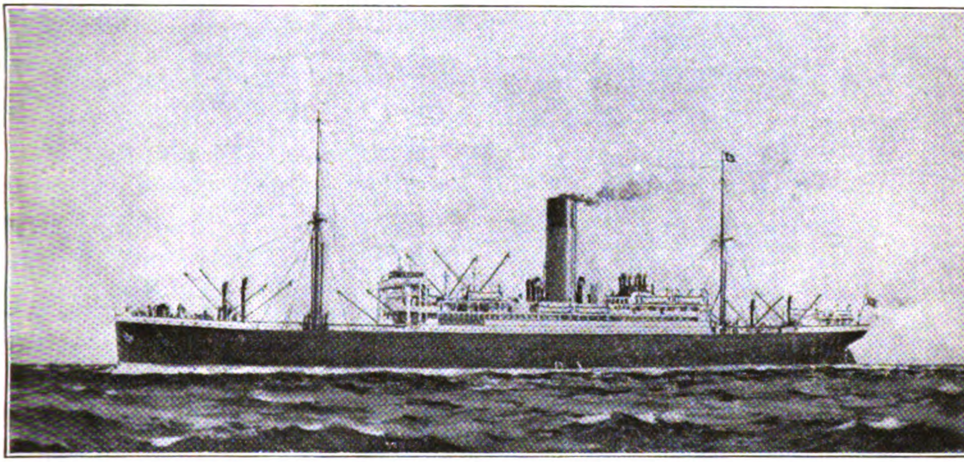

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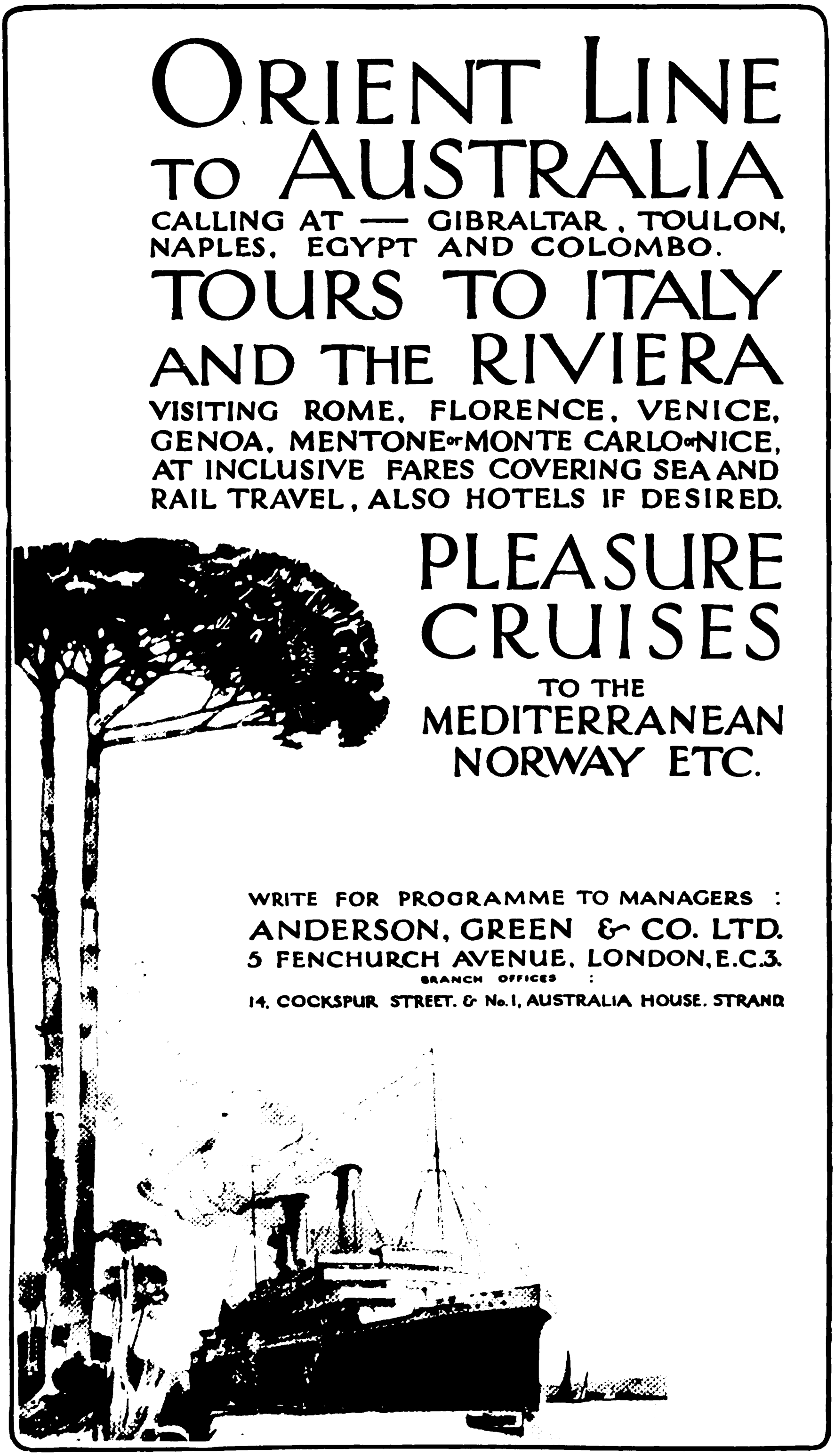

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b. battleship; *b.cr.* battle cruiser; *cr.* cruiser; *a.cr.* armoured cruiser; *l.cr.* light cruiser; *s.cr.* scout cruiser; *s.cl.cr.* second class cruiser; *t.b.d.* torpedo-boat destroyer; *c.d.* coast defence ship.

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